FREE 5GB OF VIDEOS & MORE

3DArtist

Practical inspiration for the 3D community
www.3DArtistOnline.com
95

3DS MAX 2017 UNLEASHED

\+

BUILD MODELS FROM CAD DATA

PROCEDURAL VIDEOGAME TERRAIN

EXPERT GOLAEM REVIEW

DEVELOP GAME READY WEAPONS

MAYA UPDATE TESTED

A worthwhile upgrade or just a stop gap?

COMPLEX ZBRUSH SCULPTS

Get to grips with dense, character-led scenes

UPGRADE YOUR CREATURE CONCEPTS

Discover essential tools and techniques to help you master professional level design

ILM GOES TO WAR

The VFX masters take us behind the scenes of Warcraft: The Beginning

INCREDIBLE FOAM FX WITH BIFROST

Harness the power of Maya's robust fluid toolset and achieve unbelievable results

ip IMAGINE PUBLISHING
DigitalEdition
GreatDigitalMags.com
ISSUE 095

KeyShot®
by Luxion

Amazing rendering and animation. In real-time.

As a standalone, real-time rendering application KeyShot makes creating amazing renderings and animations fast and easy, with support for the widest number of 3D file formats on both Mac and PC.

Used worldwide by top design professionals and independent 3D artists, KeyShot is the complete solution for your 3D visualization needs.

Download a free trial at www.keyshot.com/try

Model by Steve Talkowski

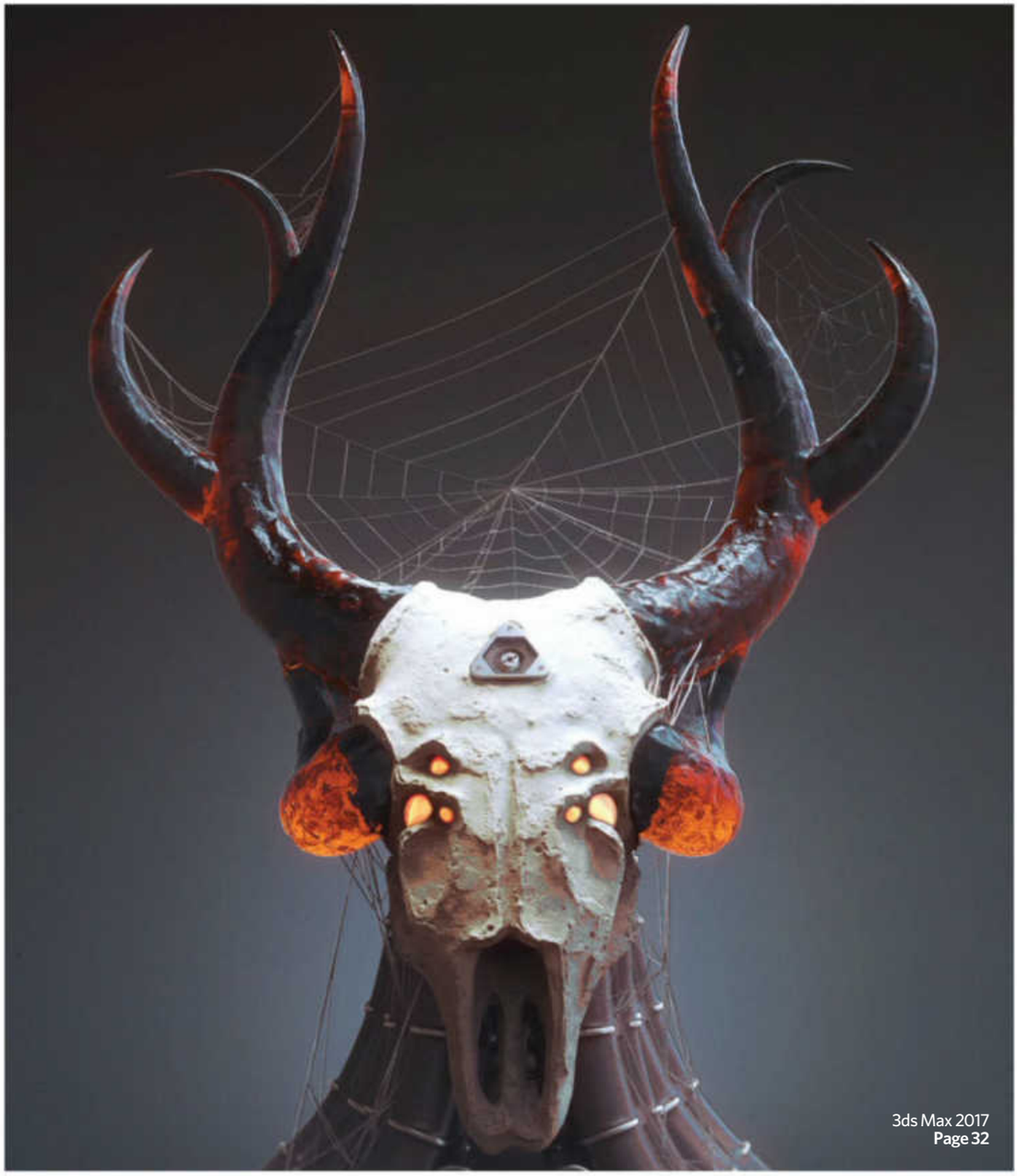
Upgrade your creature concepts Page 20

“During a visit to a local bird park, I wondered, ‘what if a bird species evolved into a bipedal being on another planet?’”

Jia Hao explains how inspiration can come from anywhere **Page 22**

Jia Hao
www.artofjiahao.com

Software ZBrush, KeyShot, Photoshop



3ds Max 2017
Page 32

Welcome

From the earliest films and games to utilise 3D and VFX to the present day, iconic creature design has been a pillar of CG – from the astonishing dinosaurs in *Jurassic Park* to the Mars-dwelling hellspawn of id Software's *Doom* reboot. There's no real right or wrong way to approach designing your own creature concepts, but it can be a daunting task to sit down and start working from imagination. We've enlisted four incredible creature experts who have each explained their approach to everything from creating a backstory to working from wildlife references.

In a similar vein, we've gone behind the scenes of *Warcraft: The Beginning* to find out how ILM weaved its creature magic to create a stunning visual spectacle. Also, we've spoken to long-term 3ds Max product manager Eddie Perlberg and a 3ds Max 2017 beta tester to bring you everything you need to know about the latest features in the popular app.

In terms of tutorials, we've spoilt you rotten this month – learn to flex your character muscle in ZBrush, create game-ready weapons with Maya and Substance Painter, build procedural terrain in Houdini for importing into Unreal Engine, use CAD data to block out a scene in Maya and master Bifröst. Have fun!

Steve Holmes, Editor

Sign up, share your art and chat to other artists at **www.3dartistonline.com**

Get in touch... 3dartist@imagine-publishing.co.uk @3DArtist Facebook.com/3DArtistMagazine

3DArtist

Imagine Publishing Ltd
Richmond House, 33 Richmond Hill
Bournemouth, Dorset BH2 6EZ
☎ +44 (0) 1202 586200
Web: www.imagine-publishing.co.uk
www.3dartistonline.com
www.greatdigitalmags.com

Magazine team

Editor Steve Holmes
stephen.holmes@imagine-publishing.co.uk
☎ 01202 586248
Production Editor Carrie Mok
Senior Staff Writer Dom Peppiatt
Art Editor Newton Ribeiro de Oliveira
Editor in Chief Amy Squibb
Senior Art Editor Will Shum
Photographer James Sheppard
Publishing Director Aaron Asadi
Head of Design Ross Andrews

Contributors
Jochem Aarts, Orestis Bastounis, Paul Champion, James Clarke, Rachel Davidowitz, Rainer Duda, Jia Hao, Ayi Sánchez, Reza Sedghi, Logan Williams

Advertising
Digital or printed media packs are available on request.
Head of Sales Hang Deretz ☎ 01202 586442
hang.deretz@imagine-publishing.co.uk
Account Manager Simon Hall ☎ 01202 586415
simon.hall@imagine-publishing.co.uk

FileSilo.co.uk
Assets and resource files for this magazine can be found on this website. Register now to unlock thousands of useful files.
Support: filesilohelp@imagine-publishing.co.uk

International
3D Artist is available for licensing. Contact the International department to discuss partnership opportunities.
Head of International Licensing Cathy Blackman
☎ +44 (0) 1202 586401
licensing@imagine-publishing.co.uk

Subscriptions
For all subscription enquiries:
3dartist@servicehelpline.co.uk
☎ UK 0844 249 0472
☎ Overseas +44 (0) 1795 592951
www.imaginesubs.co.uk
Head of Subscriptions Sharon Todd

Circulation
Circulation Director Darren Pearce ☎ 01202 586200

Production
Production Director Jane Hawkins ☎ 01202 586200

Finance
Finance Director Marco Peroni

Founder
Group Managing Director Damian Butt

Printing & Distribution
Printed by William Gibbons & Sons Ltd, 26 Planetary Road, Willenhall, West Midlands, WV13 3XT

Distributed in the UK, Eire & the Rest of the World by Marketforce, 5 Churchill Place, Canary Wharf, London E14 5HU
☎ 0203 787 9060, www.marketforce.co.uk

Distributed in Australia by Gordon & Gotch Australia Pty Ltd, 26 Rodborough Road, Frenchs Forest NSW 2086, Australia
☎ +61 2 9972 8800, www.gordongotch.com.au

Disclaimer
The publisher cannot accept responsibility for any unsolicited material lost or damaged in the post. All text and layout is the copyright of Imagine Publishing Ltd. Nothing in this magazine may be reproduced in whole or part without the written permission of the publisher. All copyrights are recognised and used specifically for the purpose of criticism and review. Although the magazine has endeavoured to ensure all information is correct at time of print, prices and availability may change. This magazine is fully independent and not affiliated in any way with the companies mentioned herein. If you submit material to Imagine Publishing via post, email, social network or any other means, you automatically grant Imagine Publishing an irrevocable, perpetual, royalty-free license to use the material across its entire portfolio, in print, online and digital, and to deliver the material to existing and future clients, including but not limited to international licensees for reproduction in international, licensed editions of Imagine products. Any material you submit is sent at your risk and, although every care is taken, neither Imagine Publishing nor its employees, agents or subcontractors shall be liable for the loss or damage.

© Imagine Publishing Ltd 2016
ISSN 1759-9636

IMAGINE PUBLISHING

recycle
When you have finished with this magazine please recycle it

ZBRUSH 4R7®
IMAGE COURTESY OF JULIEN DESROY
Pixologic
PIXOLOGIC.COM
THE ALL-IN-ONE DIGITAL SCULPTING SOLUTION.
DESIGNED FOR THE PURSUIT OF ART.

The Expert Panel

This issue's team of pro artists...

JIA HAO
artofjiahao.com

Kicking off our feature on creating stunning creature concepts is Jia, whose image of Chief caught our eye immediately thanks to its sculpted details and strong approach to colour.
3DArtist username n/a

REZA SEDGHI
lowrez.artstation.com

Sculpting just one highly detailed character can be a real challenge, but how about a scene full of them? On p44, Reza talks about how he put together his most recent composition.
3DArtist username lowrez

LOGAN WILLIAMS
LoganWilliams3Dart.com

We're big fans of FPS games, especially when they're thematic. On p52, Logan shows you how to create a game-ready weapon that's based on real-world tech, but has a bit of a steampunk edge.
3DArtist username L0WG0

RAINER DUDA
rainer-d.de

Rainer returns this month to bring his Houdini expertise into a real-time engine – in this case UE4. Learn how to build procedural terrain and make it game-ready over on p60.
3DArtist username Rainerd

RACHEL DAVIDOWITZ
racheldavidowitz.com

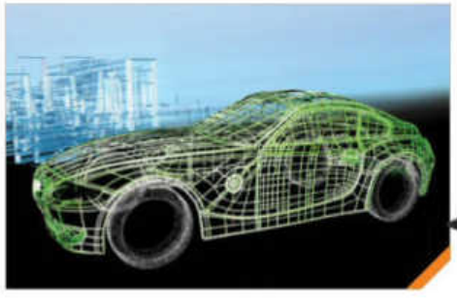
We're guilty of not showing Bifröst for Maya much love in the last few months, and so we're pleased to welcome Rachel to the mag for her considerable simulations expertise.
3DArtist username racheldavidowitz

JOCHEM AARTS
realizm.nl

Jochem is right when he says that most people working in or experimenting with arch vis rely on a 3ds Max to V-Ray workflow. However, Maya can do a superb job, too, as you'll see on p68.
3DArtist username jochem

AYI SÁNCHEZ
artstation.com/artist/kratos

As you know, 3ds Max 2017 landed recently, so we thought we'd get pro videogames artist Ayi to take it for a test drive. You'll find his review and verdict over on p78.
3DArtist username Kratos



PAUL CHAMPION
linkedin.com/in/pchampion

We've given Paul two tools to look at this month. On p80, he's put Maya 2016 Extension 2 to the test, and then he's also had a bit of fun with production-proven crowd sim software, Golaem 5.
3DArtist username Rocker

ORESTIS BASTOUNIS
twitter.com/MrBastounis

One of the more unorthodox workstations we've asked Orestis to look at, the Lenovo P40 Yoga doubles as a powerful tablet. Is it time to throw your iPad out? Find out on p74.
3DArtist username n/a

NEW FUSION 8

The world's most advanced visual effects and motion graphics software!

For over 25 years Fusion has been used to create visual effects on thousands of blockbuster films, TV shows and commercials. Fusion features an easy to use and powerful node based interface, a massive tool set, true 3D workspace and GPU accelerated performance all in a single application! Now with Fusion 8 you can use the same powerful software to create your own blockbuster effects!

Hollywood's Secret Weapon

Fusion has been used to create groundbreaking visual effects and motion graphics for Hollywood films such as The Martian, Thor and The Hunger Games, as well as on hit television shows like Orphan Black, Breaking Bad, Grimm and Battlestar Galactica! If you've ever gone to the movies or watched television, then you've seen Fusion in action!

Work Faster with Nodes

Fusion uses nodes to represent effects and filters that can be connected together to easily build up larger and more sophisticated visual effects! Nodes are organized like a flow chart so you can easily visualize complex scenes. Clicking on a node lets you quickly make adjustments, without having to hunt through layers on a timeline!

Incredible Creative Tools

Whether you need to pull a key, track objects, retouch images, animate titles, or create amazing 3D particle effects, Fusion has the creative tools you need! You get a true 3D workspace, the ability to import 3D models and scenes from software like Maya and 3ds Max, along with hundreds of tools for compositing, paint, animation and more!

Scaleable Studio Power

Fusion's GPU acceleration gives instant feedback while you work, so you spend more time being creative and less time waiting! Fusion 8 Studio also includes optical flow and stereoscopic 3D tools, along with unlimited free network rendering and tools to manage multi user workflows, track assets, assign tasks, review and approve shots, and more!

FUSION 8 ..... **Free Download**
For Mac OS X and Windows

FUSION 8 STUDIO **£705***
For Mac OS X and Windows

www.blackmagicdesign.com/uk

*SRP is Exclusive of VAT.

Contents

What's in the magazine and w

News, reviews & features

10 The Gallery
A hand-picked collection of incredible artwork to inspire you

20 Upgrade Your Creature Concepts
Four exciting artists reveal their expert approaches to imaginative design

30 Technique Focus: The Tunnel
Boy Sichterman chats about his interesting texturing process

32 3ds Max 2017
We bring you the lowdown on the latest features to hit Autodesk's tool

38 ILM Goes to War
The VFX masters take us behind the scenes of *Warcraft: The Beginning*

72 Technique Focus: Seer
Davison Carvalho tells us how he lights his blockbuster-worthy inspiring interfaces

74 Review: Lenovo P40 Yoga
The mobile workstation/tablet hybrid gets put to the test

76 Review: Golaem 5
Find out what we thought of the latest version of the popular crowd tool

78 Review: 3ds Max 2017
Our definitive verdict on the biggest software release of the year

80 Review: Maya 2016 Extension 2
No 2017 version just yet, but Maya has still enjoyed a series of updates

82 Subscribe Today!
Save money and never miss an issue by snapping up a subscription

"For me, designing a creature is like trying to justify the existence of something that is not real"

Pablo Muñoz Gomez highlights his love for creature design **Page 27**

20

Build procedural landscapes for UE4

60

Enhance foam simulations with Bifröst

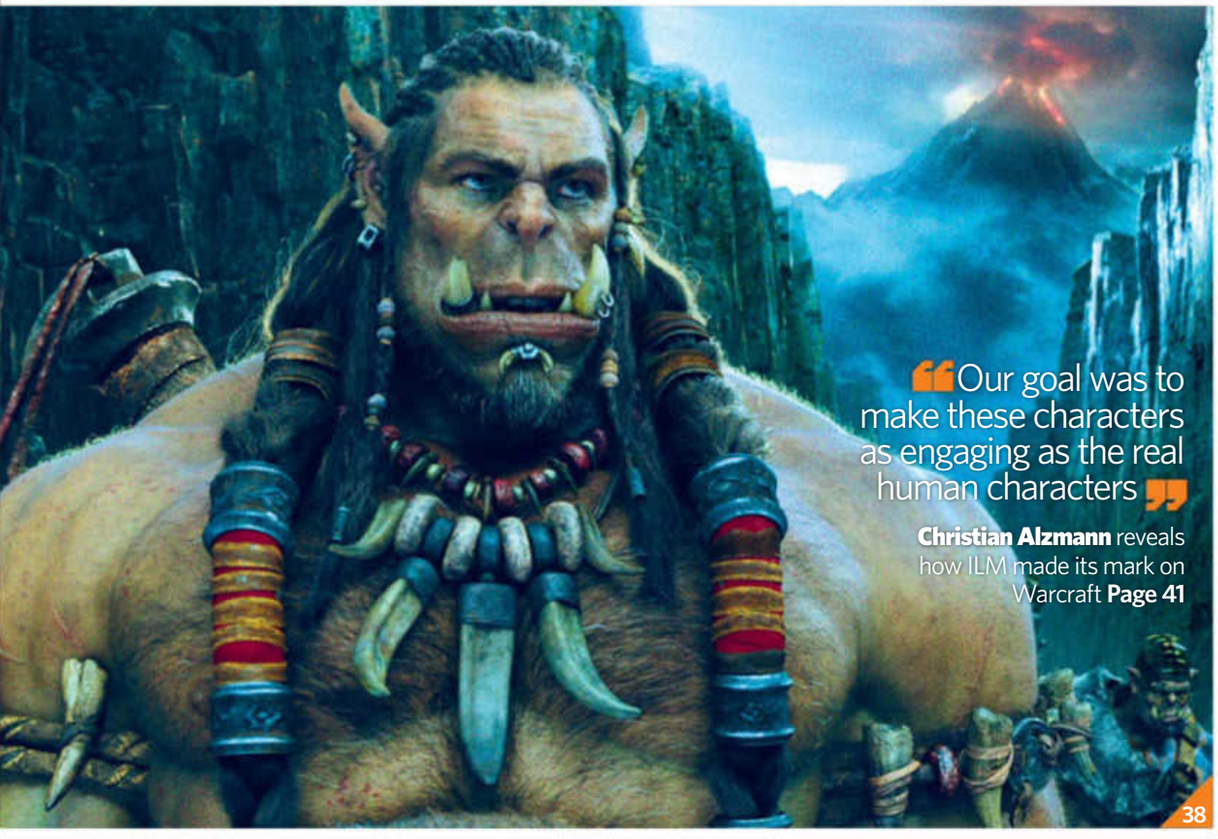
64

Lenovo P40 Yoga

74

Save up to 40%
SUBSCRIBE TODAY

Turn to page 82 for details


Our goal was to make these characters as engaging as the real human characters
Christian Alzmann reveals how ILM made its mark on Warcraft Page 41
38

The Pipeline

44 Step by step: Sculpt a complex scene with multiple characters
Pose mythical figures and build a strong ZBrush composition

52 Step by step: Design an FPS weapon from real elements
Use Maya and Substance to create a real-time game asset

60 Pipeline techniques: Build procedural landscapes for UE4
Use Houdini to generate terrain and then import into a real-time engine

64 Pipeline techniques: Enhance foam simulations with Bifröst
Make a splash with these useful techniques for Maya

68 Pipeline techniques: Block out 2D CAD forms for arch vis
Use Maya to develop and finesse stunning visualisations

The Hub

90 Community news
Artomatix wants to save smaller games studios and The Foundry appoints a chief customer officer

92 Industry news
MARI joins the growing crowd of 3D tools that are offering non-commercial versions

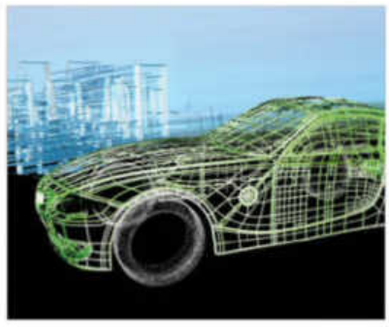
94 Readers' gallery
The very best images of the month from www.3dartistonline.com

DOWNLOAD FROM THE FileSilo

- 3 premium tree models courtesy of CGAxis
- 25 awesome textures from 3DTotal to use in your work
- A huge selection of images, scene files, texture maps and videos from our tutorials

Turn to **page 96** for the complete list of this issue's **free downloads**
filesilo.co.uk/3dartist

Visit the **3D Artist** online shop at
imagineshop.co.uk
for back issues, books and merchandise



Vinicius Costa
viniciuscosta.tv

Vinicius is the co-founder of **roofstudio.tv** and his clients include *National Geographic*

Software MODO

Concept image...

"This is a very important image for me. I created it during a time in my career where I was overwhelmed with commercial work and I was looking for another way of expressing my storytelling ideas using the 3D tools I had with me. I wanted to create an illustration that contained a full story within"

Vinicius Costa,
Dream Catcher, 2011

"I tried to develop an efficient workflow for building quad-based topology and SUBD surfaces. As the model consists of multiple parts, it was interesting to experiment with various materials and their combinations in KeyShot 6"

Liudmila Kirdiashkina, *Hawk Suit,* 2016

Liudmila Kirdiashkina
artstation.com/artist/liu_k

Liudmila is a freelance 3D artist, who started her CG work in 2011 as an illustrator

Software Softimage, ZBrush, KeyShot, Photoshop

Work in progress...

Hadrien Gouedard
obeyurnapster.unblog.fr

A high-poly artist at Oh BiBi, Hadrien was previously a character artist at Ubisoft

Software ZBrush, KeyShot

Work in progress...

“I follow the art of a French concept artist called Biboun, who does illustrations for board games, and I discovered this crazy chicken he did for a game called Heros à Louer or ‘Heroes for Rent’. The face of this chicken was so fun”

Hadrien Gouedard,
Chicken Beer, 2016

©Iello/Biboun

“The image was taken for the contest ‘Explorer of a new World’ organised by Humster3d.com. [It depicts] a child raised on a space station, going to face his own great exploration: the first day of school. I wanted to represent the first great emotion that I remember as a child: the feeling of fear and curiosity that I had on the first day of school”

Andrea Bertaccini,
Space Child, 2016

Andrea Bertaccini
tredistudio.com

Andrea established Tredistudio in 2000, and works with arch vis, animation and much more

Software 3ds Max, V-Ray, Photoshop

Work in progress...

“I always wanted to create an orc character because I love the fantasy world. This piece of work was also a good lesson on hyperrealism as well as for improving my modelling and texturing skills. I had so much fun with this render!”

Gustavo S Groppo,
Blind Guardian, 2016

Gustavo S Groppo
bit.ly/1Wi2CIu

Gustavo is a freelance 3D artist. His focus is on character modelling and texturing

Software 3ds Max, Maya, ZBrush, TopoGun, V-Ray

Work in progress...

Amal Raveedran
bit.ly/1VfnXBd

After getting a bachelor's in multimedia, Amal got himself a job as a CG lighting artist

Software Maya, Arnold, NUKE, Photoshop

Work in progress...

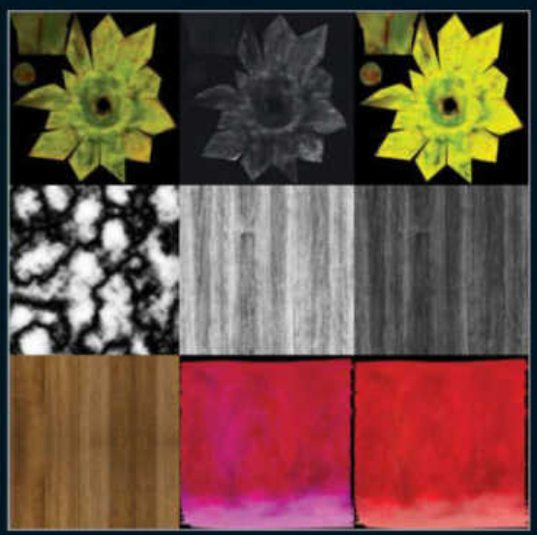
"This work – Strawberry – was just a random project I did in my spare time, but I have always been captivated by the freshness and purity of nature. The colours and the soft touch of nature's light inspired me to complete this image"

Amal Raveedran, *Strawberry,* 2016

> The best and hardest part of this project was to get the subsurface scattering right – this alone can make or break the image. I had to go through hours of different adjustments in the material settings and maps to get the look that I was hoping to get

Amal Raveedran, *Strawberry,* 2016

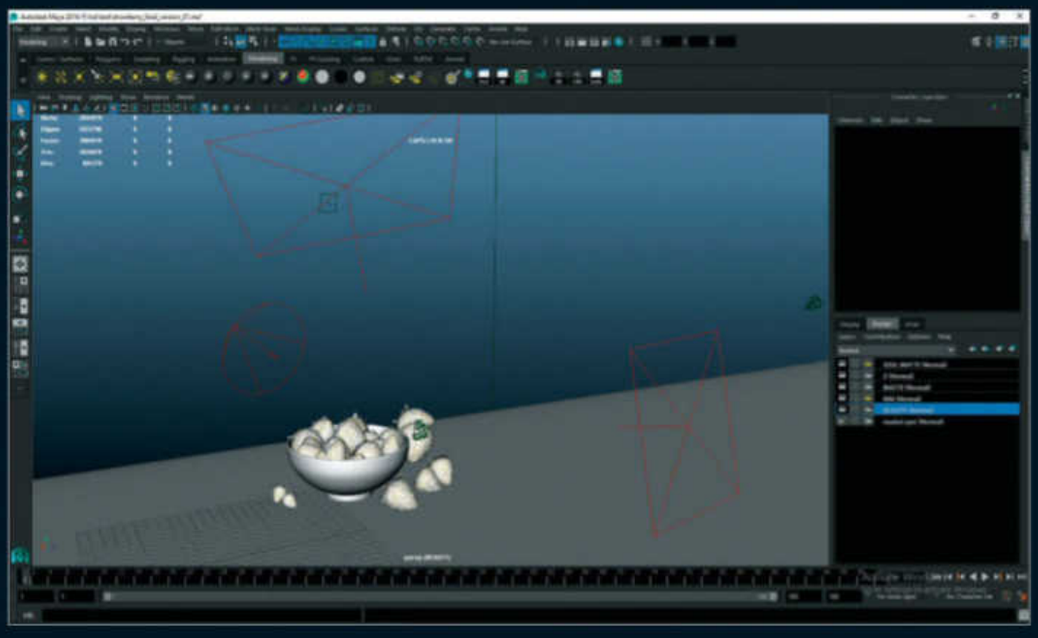
SCENE SETUP
ABOVE The basic scene setup includes preparing the rough layout of models, setting up the camera and also setting basic lighting. Here, I used the model of the strawberry that I had with me from an old work file. The wooden pot and floor were modelled specifically for this piece. The strawberries were placed randomly in the scene. It's also important to be aware of things like frame balancing and the impact that this has on overall frame beauty.



SHADING AND TEXTURING
ABOVE I used Arnold's standard shader for all the objects, and all the textures were created using Photoshop. As for the shading, to get the natural look and that natural beauty for objects, I created and used maps like bump, specular and diffuse to get a totally natural feel for the environment. Also, for the strawberry, I created an SSS map.

COMPOSITING
ABOVE For the compositing stage, which was completed in NUKE, I decided to take out the render with the render passes, which in the case of Arnold are known as arbitrary output values (or AOVs). I used basic passes here, for example these will include direct/indirect diffuse, direct/indirect specular, reflection, direct/indirect SSS, occlusion, normal and so on.

RENDERING
ABOVE This is the most crucial part of the work because this is where we get to decide the quality. I used a low-quality render for visual development: it helps me get an idea of the final render, and what settings are needed to be changed or enhanced to improve the quality. The first render was too noisy so I increased the glossy, reflection, SSS and ray-depth samples to the desired values. Finally I adjusted the anti-aliasing of the camera.



LIGHTING RIG
LEFT In the beginning, I used an Arnold rectangular light as a key light, a spotlight as a rim light and another rectangular light as a fill light. At first, I just worked with a diffuse grey material as base material just to understand the light intensity and falloff. Then I adjusted the position of each of the lights until I got a satisfying base lighting.

Jia Hao's character, Chief, was inspired by exotic birds and tribal customs from around the world

UPGRADE YOUR CREATURE CONCEPTS

Four incredible artists reveal the tools and inspiration to help you create your own world-class creature designs

Creature design, like narrative or story design, needs a hook to grab an audience's attention. It needs something special, something unique, to make someone stop and look and take in this creature you've created. Whether you're gunning for realism or high fantasy, re-creating a likeness or simply working to your own high concept musings, creature design needs personality. It needs personality dripping from every pore.

We scoured portfolios, showreels, galleries and forums to find some of the most creative, captivating creature designs out there, and talk to their creators about how they were brought to life so completely. Each creature you'll see over the following pages has its own narrative, tells its own story and does so without coming across as clichéd or disingenuous. That's no mean feat though: fantasy tropes are *everywhere* these days and to create something original and spellbinding can be an almost impossible task.

We spoke to the artists behind these magical beasts to try and find out what their references were, what tools they used to craft these monsters and what advice they had for budding creature designers that might be sat out in the wild right now. Come with us as we discover these fantastical beasts and how to make them.

"During a visit to a local bird park, I was inspired by all the amazing species of bird"

Jia Hao, *Chief*, 2016

Jia Hao
artofjiahao.com
Jia is a self-taught creature and character designer. His passion is in designing imaginative creatures and characters.

MAKING USE OF NATURE

Discover how real-life animals inspired the creation of Jia Hao's majestic Chief creature

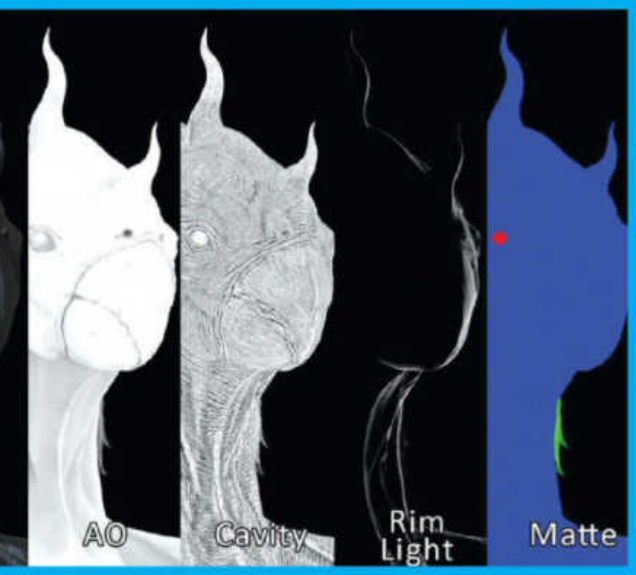
01 **Get inspiration** Taking regular outdoor trips can be a great source of inspiration. During a visit to a local bird park, I was inspired by all the amazing species of birds that were there and wondered 'what if a bird species evolved into a bipedal being on another planet?'. After choosing some of the photos I took, I put together a reference sheet to start sketching in ZBrush.

02 **Sketch in ZBrush** I started with a DynaMesh sphere at very low resolution and used ClayBuildup, Move, Move with AccuCurve, Standard and Dam_Standard to start sketching. I constantly sketch from all angles: upside down, and zooming in and out to find an appealing form and silhouette. I like to minimise the undo process. If I make a mistake, I sketch over it and let it evolve into a new form, even if it's a happy accident.

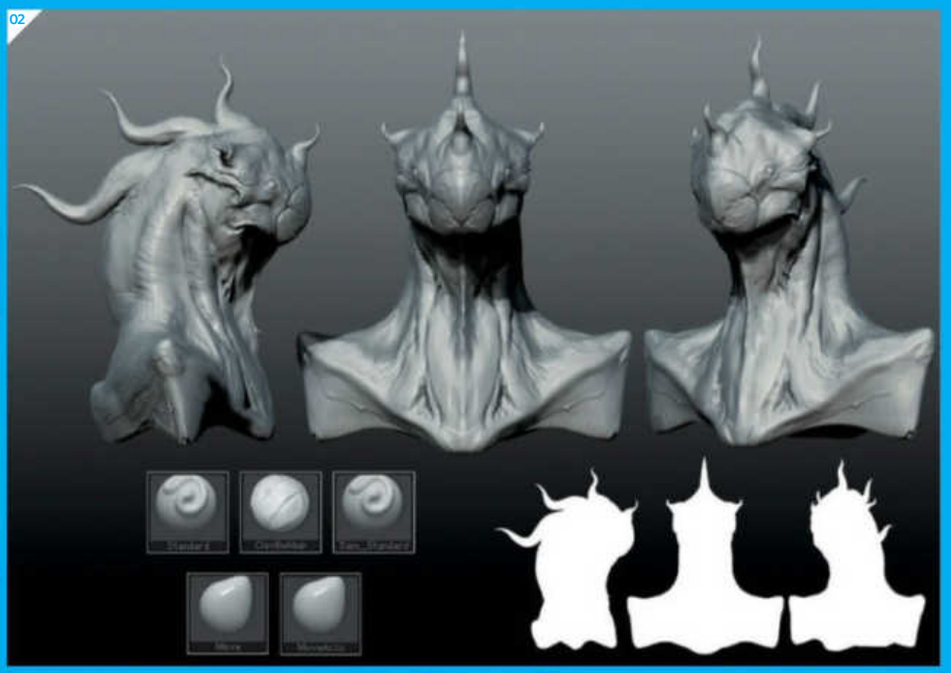
03 **Sculpt and detail** To achieve a more refined sculpt, I subdivided the mesh. Next I sculpted using the same brushes and with hPolish, mPolish and TrimDynamic. I used an Interactive Light to check the form under different light directions, and then I did quick renders to make sure the form and crevices read clearly. I detailed the model, introducing skin pores, wrinkles, bumps, vein and beak textures with different combination of brushes and alphas. I like to adjust brush size and Z Intensity regularly to get more believable details.

04 **Render in KeyShot** When it comes to rendering, I often use KeyShot because it is fast and easy to set up. I like to render in passes because when it comes to compositing in Photoshop, I can use adjustment layers such as level and hue saturation to tune each pass individually to get my desired result. A flexible workflow is my preferred method of working.

05 **Composite in Photoshop** I composited render passes together using different tools, including mixing blend modes, adjustment layers and so on. By using hue saturation and level adjustment layers, I checked for overall value clarity and highlights of the image to ensure that the composition had pleasing value contrast and focus.



02



FEATHER CREATION

As for the feathers, I utilised the feather brush that was created by another artist, Pablo Muñoz Gomez. You can read his wonderful tutorial and learn how to use his IMM brush at **zbrushguides.com/zbrush-feathers-tutorial**.

When placing the feather in ZBrush, I tried to create a pleasing flow. I polygrouped certain feathers together so that I could adjust them easily using Move tool/brush. I also used the Move brush to introduce some randomness to make it look more believable. To touch up the feathers in Photoshop, I simply used a soft round brush with a small brush size, and sampled the desired colour and paint. I also softened the edge of the feathers using a soft eraser brush.

Luiz Alves
artstation.com/artist/luizalves
Since Luiz was a child, he always loved creatures, animals and – of course – dinosaurs. He is a character and creature artist.

EVOLVING YOUR DESIGN

In this Q&A, Luiz explains how he merged two distinct creatures into one design

First things first – what made you decide to combine a velociraptor and a chicken?
For a long time I was planning to reproduce a velociraptor. When I took a look on the internet I found concept art from Brent Hollowell and it looked *awesome*, so I imagined the concept of combining a traditional chicken and a velociraptor, and the idea just evolved from there!

What tools do you use in your work and why?
For the most part I use ZBrush, 3ds Max and Photoshop – they're my basic tools and have been for years. My favourite tool is ZBrush because no other tool gives me as much flexibility and freedom for design. For post-production I like to use Photoshop as it's a powerful and simple tool. I like to use 3ds Max in general for elaborate and more technical things, like UV mapping and retopology.

What advice can you give to artists looking to create their own creature concepts?
The best trick I could suggest is to look at references before starting any project. Take a look at concepts, real images of animals and everything you can. The most important thing in creature design is reproducing real elements with elegance and making it believable. If we follow these rules, we can explore great ideas even in the simplest things!

What are the most important things to remember when designing creatures?
Aa good silhouette can make your model strong. Of course, the fine details are important too, but a good design can make a simple model look awesome.

How do you make your models so believable?
You should look for how fine details find a 'flow' on surfaces; in general you'll have a lot of flows on organic models – respect them, make your fine details really believable.

What draws you to creature design? Why is it so interesting to you?
I love the possibility of making something fantastic in my mind real. Exploring ideas that I never did before, it's fantastic. Of course it would be great to see a creature like this in a cinematic or a game!

Hair In the initial concept I imagined a lot of feathers similar to Brent Hollowell's concept, but after working on the creature I liked the details, so I decided not to hide it and make something like semi-feathers... the result was more discreet.

Eyes In the eyes I tried to simulate a common deformation in crocodile eyes; something I think contributes a lot to giving a dangerous and alert aspect.

> “The best trick I could suggest is to look at references before starting any project. Take a look at concepts, real images of animals and everything you can”

Beak I imagined that the beak would be great to make a flow in scales. We can see a movement that is going along the head and connecting to the beak – with the paint, this flow looks even more visible.

> The more sketches the better. The first few sketches are full of clichés and visual references that you might have collected throughout the day... I feel that the designs get progressively more original and more interesting with every iteration

Pablo Muñoz Gomez
artstation.com/artist/pablander
A concept artist, 3D sculptor and educator, Pablo now lives in Melbourne, Australia and is a well-known presence in online 3D art communities.

BRING YOUR ART TO LIFE

Pablo Muñoz Gomez teaches us everything we need to know to master characterisation

If there are three things that you bear in mind when creating creature designs, what would you say they are?
When designing a creature, I like to imagine the world or environment that it inhabits. Having a rough idea of where the creature lives, or what the conditions of its surroundings are, helps me produce a believable design. Even if I never get to create the environment for the creature, considering things like whether it lives underground or not can drastically change the way I shape the eyes or body proportions, for instance.

I also try to keep contrast between the elements in the design. This could be anything from the colour and textures to the volumes and details of the model. For example, if I have a highly detailed area to grab the viewer's attention, I like to make sure it is followed by smoother surfaces or a plain colour where the eye can rest.

Proportions is another thing that is always in my mind when designing creatures. Creating an interesting relation between the main shapes like limbs or face features could make the design look either more appealing or ridiculous.

What is it about creature design that makes it such an attractive pursuit for you?
There is something about creature design that is very appealing. For me, I think it's the fact that designing a creature is like trying to justify the existence of something that is not real. It is also a challenge to make a believable design, so thinking how the anatomy would work, what the purpose of a horn or third eye is or why it has six arms is absolutely fascinating.

Do you normally work with sketches before getting stuck into sculpting? If so, how do you go about it and why is it important?
It depends on the project. Sometimes I spend hours producing little thumbnails to warm up and get a good sense of what I'm going for, but I could also jump straight into ZBrush and do my sketching with DynaMesh from the beginning.

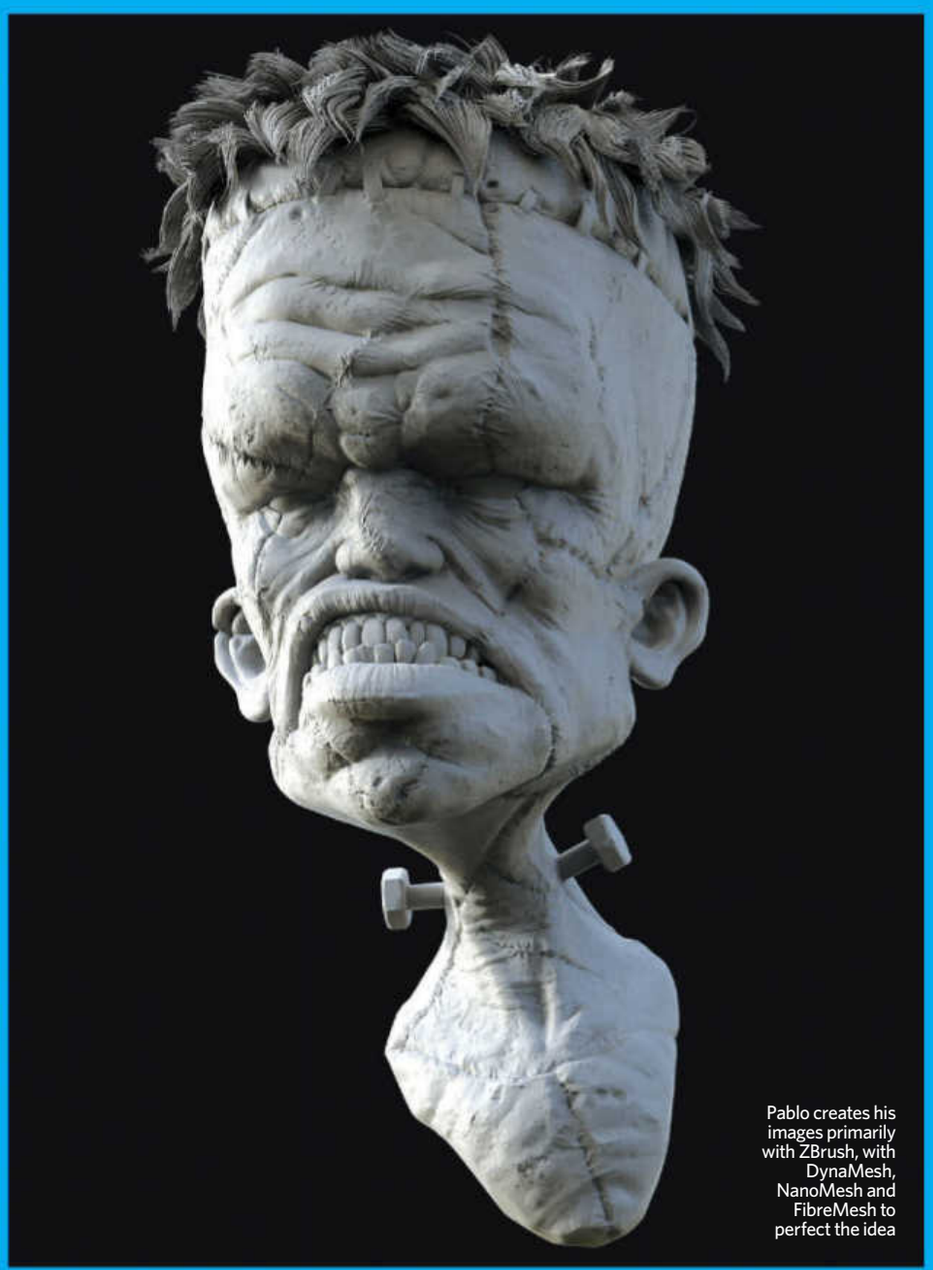
Regardless of the project or how I start it, I believe that it is incredibly valuable to go through the sketching process for two reasons. Firstly, you can create numerous variations that will help you decide what the best option is before you get too invested in an idea that might not be very solid. Also you can share the sketches with other people and then get some feedback to help you refine your original concept further.

Secondly, the more sketches the better. The first few sketches are full of clichés and visual references that you might have collected throughout the day. These are not necessarily bad, but I feel that the designs get progressively more original and more interesting with every iteration.

What would you say are your favourite tools inside of ZBrush for creature design?
DynaMesh is certainly one of my favourite tools, especially when used in combination with Insert and custom brushes. Another two processes I found extremely useful are NanoMesh and FiberMesh to add details and fur.

Finally, what advice would you give to anyone looking to spruce up their creature concepts?
I'd say use references and look at nature. I think using references is an integral part of the design process, especially in creature design. For instance, if you are sculpting a horn, it's likely that you would know the exact shape of it and remember all of the intricate relations between its forms, but you will still be relying on your memory. You might not remember all of the little indentations, cracks, dirt and an abundance of things that make it so real.

Also, in nature there is an infinite source of inspiration for creatures. A quick internet search on 'abyssal fish' or 'tropical flowers' could be the catalyst of a whole new piece of original work.



Pablo creates his images primarily with ZBrush, with DynaMesh, NanoMesh and FibreMesh to perfect the idea

Limkuk
artstation.com/artist/limkuk
Limkuk is a freelance 3D character artist from Mexico, lover of aliens and sci-fi stories, and CEO and founder of Lamprea Studio.

PERFECTING THE CONCEPT

Limkuk explains how to get your best ideas out of your head and onto your screen

There are many paths to becoming a creature designer – but no one really starts out doing it. "I am a graphic designer, but I decided to specialise in creation and conceptualisation of creatures," explains Limkuk. "I have been working as a freelance 3D artist and graphic designer for three years, developing characters for commercials – I have always liked creating new species."

Like many concept and character artists, Limkuk began creating his own creatures after being inspired by the works of others throughout popular media. "Since I was a kid I've been a fan of aliens, sci-fi films and others related to the cinema and videogame worlds," he tells **3D Artist**. "I always liked to draw the characters in those films that I watched and since then I've always told my parents that I would like to work in this industry."

Limkuk tells us that he follows the work of other artists pretty closely, too – it stands to reason that by studying the work of peers and others in the industry you can continue to inspire yourself and push yourself to new limits.

"I admire five artists in the world: Alex Alvarez, Rafael Grassetti, Dominic Qwek, Edgar Gomez and Soren Zaragoza," Limkuk explains. "The way they create characters, creatures and new concepts is what makes me follow their work!"

Limkuk prefers to initially create his concepts with paper and ink so he has something tangible to refer to first. "Then, when I move to digital, I use ZBrush, Photoshop, KeyShot and Maya. These digital tools make the whole process easier, especially when creating a new concept with few tools – especially in the case of ZBrush."

By going through a process of observing others, looking at how they make their own creatures, sketching and outlining your own projects and finally converting to 3D software, you too can create monsters and creatures as well realised as Limkuk's.

> "Since I was a kid I've been a fan of aliens, sci-fi films and others related to the cinema and videogame worlds"

5 THINGS YOU NEED TO KNOW ABOUT CREATURES

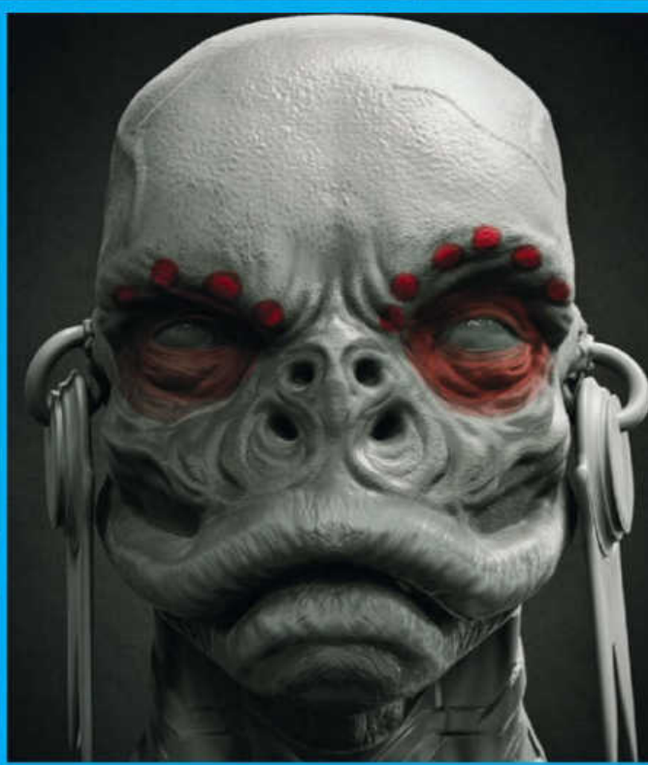
1 Study a lot of anatomy, both human and animal

2 Do not get frustrated when doing sketches

3 Draw silhouettes (trust me, this has been very useful to me)

4 Be guided and *always* work with references

5 Do not lose patience, keep studying and working for the results you want to get



The fastest just got faster.

Fusion Render OC II M4000

Professional 3D Editing Workstation

- Intel® Core™ i7-6800K "Broadwell-E" Processor
- NVIDIA Quadro M4000 8GB
- 512GB PCIe SSD

From £2499.99

For full specs please visit: www.chillblast.com/Render2

First with the latest technology

Chillblast

www.chillblast.com/Render2

Call our sales team on 01202057275

Intel, the Intel Logo, Intel Inside, Intel Core, Core Inside are trademarks of Intel Corporation in the U.S. and/or other countries.
Prices are correct at time of going to press (20-05-16) E&OE

Technique focus

Incredible 3D artists take us behind their artwork

TEXTURING Before texturing I always create a simple blockout and overlay textures in Photoshop to get an idea of the overall design and feeling of the scene and textures. I then create tiling base materials in Quixel that I can quickly apply to all the models in UE4, even though I know that I will replace some of them later.

Boy Sichterman
boysichterman.com
Boy is currently working at Elite3D in Spain while finishing his studies in the Netherlands

Software Maya, Photoshop, UE4, Quixel DDO, Marvelous Designer

The Tunnel, 2016

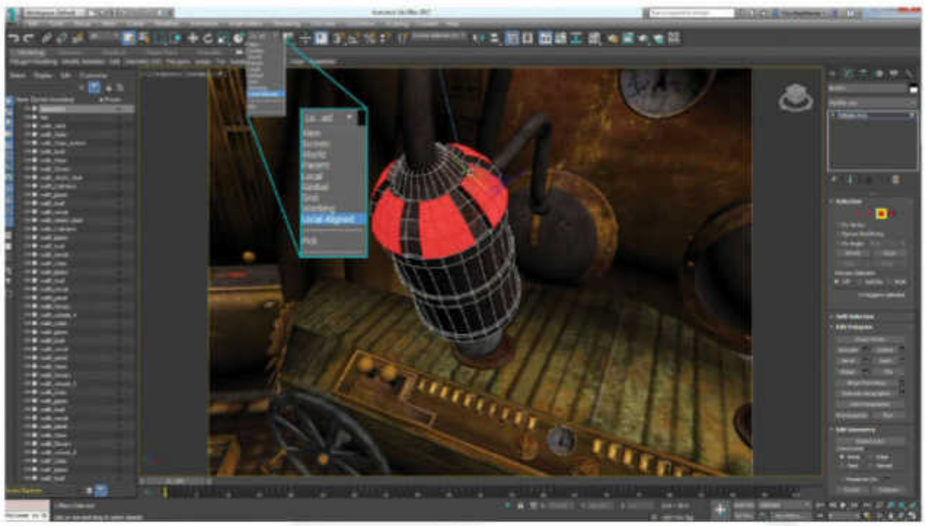
3DS MAX 2017

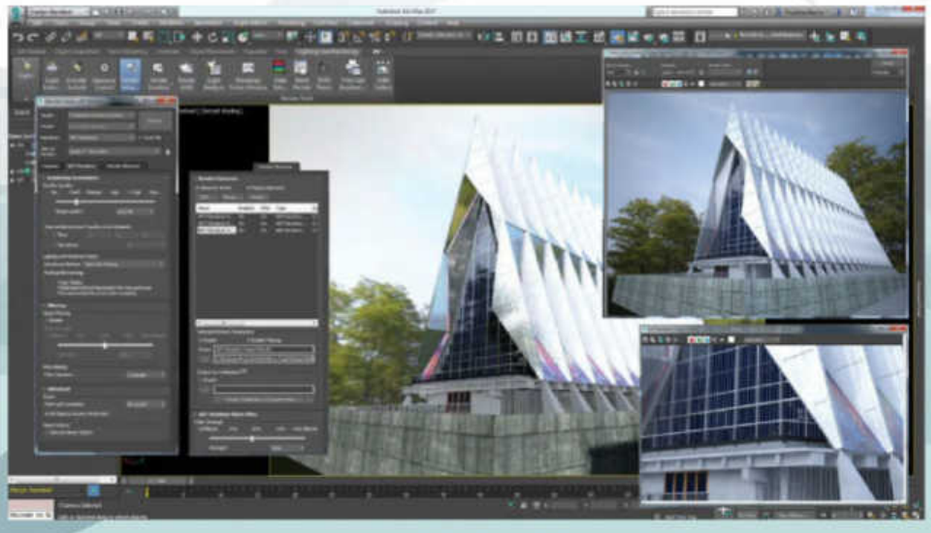
Prey by
Mark Van Haitsma

OUR EXPERT VERDICT
PAGE 78

Eddie Perlberg and John Martini guide Dom Peppiatt through all the newest features of the industry's most prolific 3D application

Martini has been creating art that pushes 3ds Max 2017 tools to their limit





Two decades – that's how long 3ds Max has been around for. It's a long time for any kind of software in any industry, but in the VFX world that's practically a lifetime. Through a gamut of name changes and a whole catalogue of enhancements, the core premise of 3ds Max has always been straightforward: provide industry-standard tools for creatives to be, well, creative with. It's a clear vision, and one that certainly hasn't clouded with age.

"For 2017 we wanted to affect peoples' day-to-day lives," says 3ds Max product manager, Eddie Perlberg, bluntly. "So improving the UV unwrapping technology, the updates to the UI, performance improvements as far as the viewport is concerned – all of these we thought would have a direct impact on how people work day to day."

While that could be interpreted as a throwaway statement – it's obvious that Autodesk has listened to its core consumer base with the 2017 release: the features that the users wanted to get in *got* in, the improvements that artists wanted made *were* made. That 'day-to-day' working practice that Perlberg was talking about – it applies to every step of the creative process as well as every second that beta tester John 'Joker' Martini spent with the 2017 offering.

"I had been testing and using 3ds Max 2017 for almost a year," Martini told us, "working closely with the designers and developers at Autodesk. My task is to supply the Autodesk team with feedback, workflow suggestions, and in some cases, concepts for design."

Martini has been using 3ds Max since 1999 (that's 17 years for anyone counting!) and as a 3D generalist for employers from Blur Studio to Digital Domain, Pixomondo to Red Storm Ubisoft, he's certainly learned *exactly* what is and isn't productive in a software package.

"There were a few features, among the many, that really stood out to me," Martini explains, when we ask if any enhancements in 3ds Max 2017 made a particularly notable difference to the way he worked. "The expanded operators for Max Creation Graph (MCG) are my top pick. Being a tool developer myself, it was great to see MCG's continued development and expansion. One overlooked feature, which came as a side effect from the

3DS MAX 2017 NEW FEATURES

Launched on 18 April 2016, 3ds Max 2017 makes a few major changes to the now traditional updates that consumers are used to. The most obvious change to take note of is the integration of the Autodesk Raytrace Renderer – something that is likely to disrupt the typical 3ds Max-to-V-Ray route that most professionals are used to. There are more additions to the 2017 version than just that one game-changing revision, though – we've *massively* simplified these updates and condensed them into a handy cheat sheet for your reference:

ANIMATION

- Geodesic Voxel and heatmap skinning
- MCG animation controllers

MODELLING & TEXTURING

- Fast form hard surfaces
- Text and shape map

RENDERING

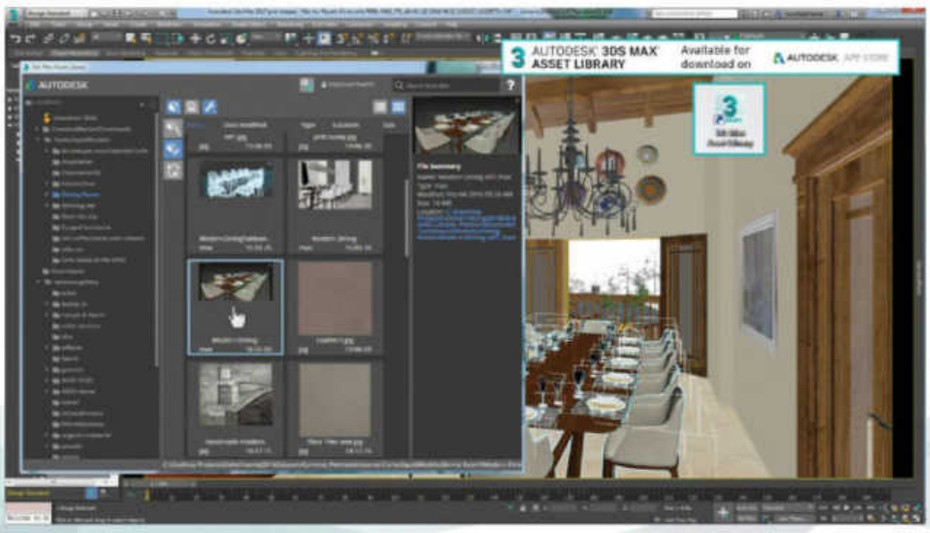
- Autodesk Raytracer Renderer (ART)

DYNAMICS & FX

- Simple Simulation data import

UI, WORKFLOW & PIPELINE

- Improved pipeline tools integration
- Asset library
- High DPI display
- Support scene converter
- Game exporter
- Live link
- Better support for Stingray shaders
- Design workspace
- Template system
- One-click Print Studio access



26 years of 3ds Max

We've tracked the evolution of the software from a five-module product to industry-leading 3D tool

1988

Tom Hudson creates THUD, with Shaper, Lofter, Editor and Material Editor modules. Dan Silva joins the project and adds keyframing. Autodesk agrees to publish them.

1990

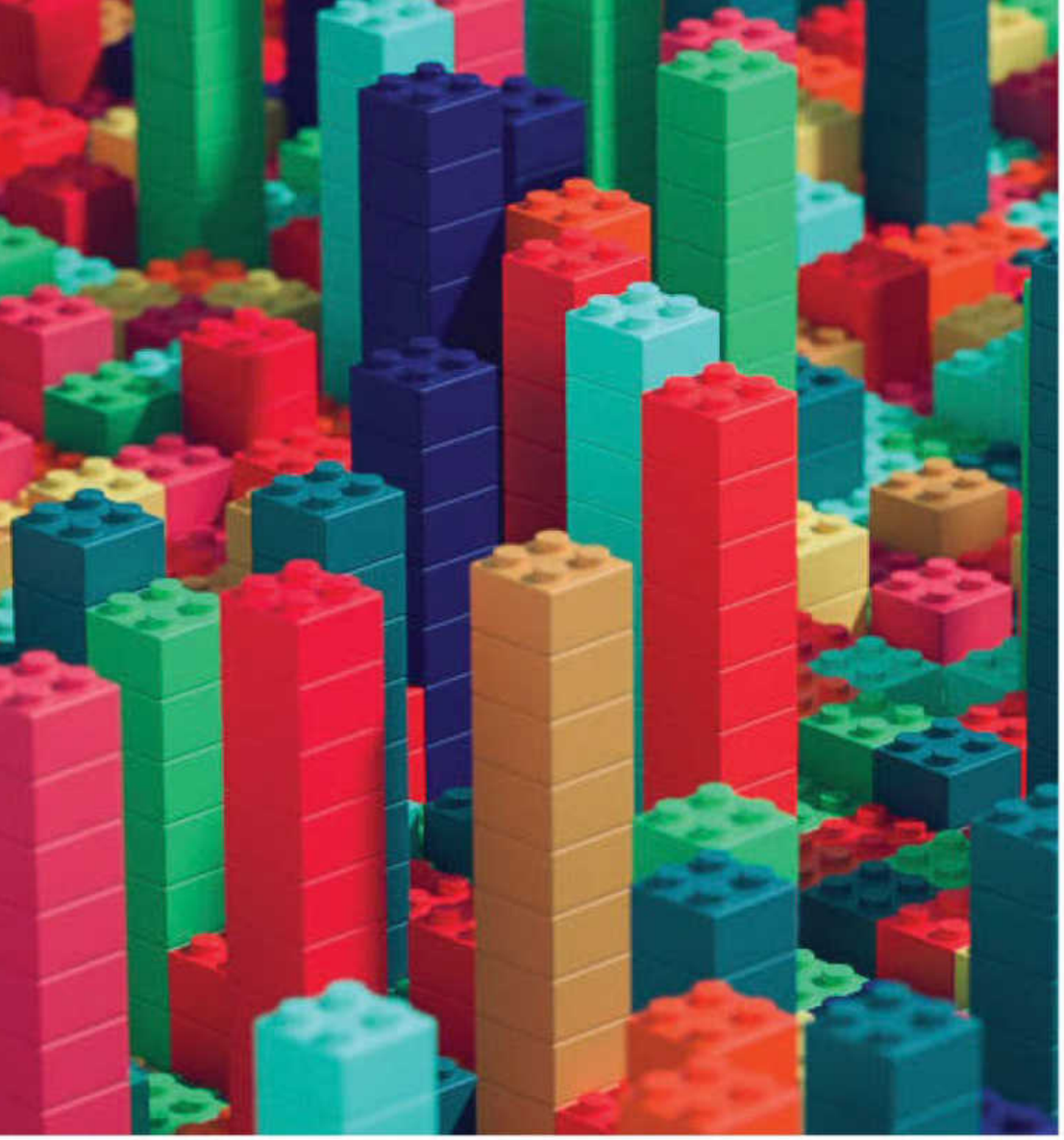
Autodesk releases all five modules together, as 3D Studio, for $3,495. It also opens up the Area section of its website for community news, software support and updates.

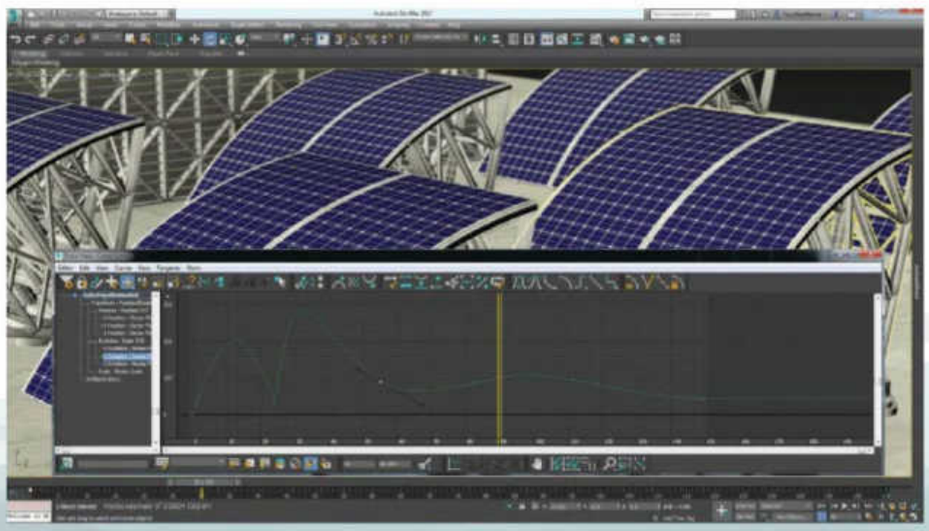
1992

3D Studio R2 released – image processing, procedural modelling, animation and surfaces are added. YOST Group produces several plugin suites.

1993

Renderer and Material Editor get overhauls in 3D Studio R3, with bitmap processing and keyframing extensions added. Work begins on 3ds Max Windows framework.





new operators being added, is the new plugin class types. There are over five new plugin class types such as Modifiers and Splines, just to name a couple."

"Oh my goodness! It's like [having] children," Perlberg responds when we ask him the same question. "It's hard to pick a favourite [new feature]. I really don't know how to answer that, because for the modellers the new enhanced Booleans is going to have a dramatic effect, for the texture artists or character artists the new UV unwrapping and Geodesic Voxel skinning are going to have a major impact, for the design visualisation person some of the features of the new rendering technology and things like that are going to have dramatic effects. We appreciate that 3ds Max is truly a generalist's tool – all of these are going to be the kinds of things that, at the end of a project, are all going to save time and [increase] efficiency."

Both Perlberg and Martini keep coming back to that word, 'efficiency'. When you're working with a tool like 3ds Max, though, it makes sense: creating 3D art can take a lot of time, and you don't want unoptimised software bogging you down in the technical side when you want to get creating.

"One major feature which often gets forgotten about is stability," explains Martini. "Over the past several years, the development team has really been pushing to stabilise the core foundation of 3ds Max. Based on personal experience, 3ds Max used to crash multiple times a day. With the latest version of 3ds Max, I can go several weeks and – in some cases – a month without ever having 3ds Max crash."

More specifically, though, one of the most notable features to 3ds Max 2017 is how Viewport works. Through Max's long history, the viewing window tech has gotten visibly better and more intelligent – allowing for better, more representative previews. 2017's update is the next logical step in that chain.

"The UV Editor and Viewport performance enhancements to 3ds Max have certainly sped up the workflow and efficiency capabilities," agrees Martini. "Oftentimes, I'm managing scenes with over 10 million polygons, 5,000 objects and files which are more than five gigabytes in size.

1994

3D Studio R4 is released – Kinematics, Fast (Shaded) Preview and Keyscript are added. *The Craft* and *Jonny Mnemonic* are created with this current version.

1995

3D Studio MAX is announced at SIGGRAPH: it is a 32-bit app that is based exclusively on plugin architecture, it's the first-ever 3D tool to feature an 'undo' button.

1996

3D Studio Max is formally released and *Tomb Raider* is made using this software. Features added to version R1.1 include an editable mesh as well as network rendering.

1997

Autodesk announces 3D Studio Max 2. Version 2.5 is released in 1998 with camera matching and NURBS support, as part of the designer utility pack (DUP).

1999

Discreet Logic Inc is acquired by Autodesk and 3D Studio MAX R3 is shipped with GUI customisation introduced, plugin macro-recording made possible and cross-talk enabled.

2000

Autodesk ships 3ds Max R4, renaming the software. Features are expanded with redesigned Drag/Drop support, Direct X Shader support plus plenty of others.

2003

Mental ray becomes part of the base package for the 3ds Max 6 release, and Particle Flow is introduced with new Vertex Paint and a refactored Schematic View.

2004

3ds Max 7 released, featuring subsurface scattering, ambient occlusion, render-to-texture support, first-person navigation in viewport and more.

"It's a night and day difference when you compare performance to earlier versions of 3ds Max."

Autodesk has made one pretty significant shake-up to the standard workflow with the 2017 update – given that Max to V-Ray is an established pipeline in many industries, it took some professionals by surprise when Autodesk launched its own renderer.

"So, the Autodesk Raytracer Render – the ART renderer – is the rendering technology that is making its way into all of our design applications: Revit, Inventor, AutoCAD and so on," explains Perlberg. "Because 3ds Max is in each and every single one of the industry collections at Autodesk – it's the *only* software that's in *every* one of them – we need to make sure that we are as interoperable [as possible]. The ecosystem almost demanded that we were able to have a one-click workflow within all of those industries."

> "It's a night and day difference when you compare performance to earlier versions of 3ds Max"
>
> **John Martini,**
> 3ds Max 2017 beta tester

But that doesn't mean that Perlberg and (by extension) Autodesk expects studios like ILM and Pixomondo to abandon their V-Ray pipeline any time soon – this is simply an arrangement that will better suit its non-professional user base: "For those casual users who are looking for a simple, great result out of the box, this is rendering technology that Autodesk develops and so it would be almost outrageous for us not to include it."

This sentiment has been echoed by Martini – as he has been a V-Ray user for seven years, this was a pretty big update to 3ds Max that was lost on him. "For me, the new ART Raytracer Renderer is cool technology, but does not bring a lot of production value to me. There are so many render engines out there nowadays, and many of them 'miss the mark' on what's necessary for production."

Martini does urge users to experiment with another of Max's bigger updates, though – the improved Python API. "I've spent many years building tools for production pipelines and managing assets from all over the world," he explains, "and this API makes developing tools and streamlining data easier than it ever has been before. Python is a cross-platform and multi-application supported language. Newcomers to Python can easily pick it up in just a few weeks."

2005
3ds Max 8 is released with a MAXScript debugger, improved polygon modelling, Cloth mode, Motion Mixer Support for non-bipedal objects and more.

2006
The software is renamed again. Autodesk 3ds Max version 9 is released with ProBoolean and ProCutter, Arch&Design shaders and Animation Layers.

2007
3ds Max 2008 is launched with a new naming convention. Performance is hugely optimised, MAXScript ProEditor comes in and Adaptive Degradation is implemented.

2008
Features for the 3ds Max 2009 version include Reveal rendering tools, ProMaterials library, UV editing tools and better Maya, Mudbox and MotionBuilder compatibility.

2009
The 2010 version of 3ds Max is released with over 350 new features. Render-like effects are made available in the viewport, eg soft shadowing, exposure control and AO.

2010
3ds Max 2011 is released with full Windows 7 support. Comes with new node-based material editor, a fully featured compositor and a hardware renderer.

2011
Version 2012 is launched with improved viewport performance. Substance Procedural textures gets 80 additions, with more stable Iray rendering.

2012
3ds Max 2013 is released: with a whole new render pass system. The many compatibility upgrades, customisable workspaces and tabbed layouts all aid productivity.

If learning a whole new programming language sounds a bit too intimidating, then there are other tools available that will enable you to customise 3ds Max for your own pipeline, too. The Max Creation Graph – something both Martini and Perlberg openly praised – was only introduced in 3ds Max 2016, but already it's becoming one of the most notable features to come included with the Max program.

> "3ds Max is going to be very important in providing the content for AR and VR"
>
> **Eddie Perlberg,** 3ds Max product manager

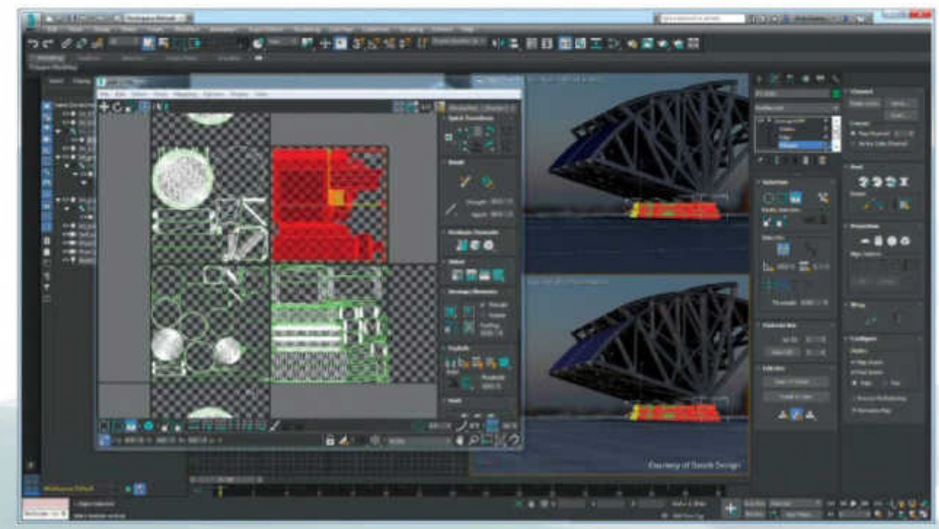
"The MCG really does extend the power of 3ds Max and its customisation capability allows the Max user to create or consume tools that are very specific to their pipeline," Perlberg explains. "MaxScript users have always had the opportunity to extend the capability of 3ds Max – MCG really is a more modern node-based toolset that allows for the creation of simple tasks as well as very specific ones."

Being multithreaded, the MCG has been designed from the ground up to be a more capable, more performance-driven tool. "It is something that we're hoping people will find value in either as a creator, or just as a consumer, to download and use and run them for smarter content," Perlberg told us.

"[There's a bit of a] learning curve to it, though," admits Martini. "The tool development arena is not something you can pick up without having a basic understanding of scripting. MCG comes with some very 'high' level nodes and some 'low' level nodes, and I think the balancing act of these nodes will reduce the learning curve of MCG as it continues to develop."

Despite adding new features and making sure that the core stability remains constant and secure, Autodesk clearly isn't taking its foot off the pedal with 3ds Max. "I would hate to be the product manager for word processing software – what else could you do to word processing?" laughs Perlberg.

"Being the product manager for 3ds Max, even just a few years ago we weren't talking about AR, VR and real-time presentations of design the way we are today – 3ds Max is going to be very important in providing the content for that. When you talk about all the hardware developments that you see on the horizon, the way you experience your software, how you create – all of those things are the things that we look at for the long-term development of 3ds Max. Imagine being able to create in a virtual environment, not just experience what you've created."



Perlberg was very clear that Autodesk wanted 3ds Max 2017 to improve the 'quality of life' of artists

2013

3ds Max 2014 is launched. Vector map support, crowd animation, perspective match and augmented particle flow system head up the features for this huge update.

2014

A *lot* of user interface improvements and user-suggested workflow aids are introduced in 3ds Max 2015 (Undo/Redo's location on the main toolbar are a big hit!).

2015

3ds Max 2016 is launched as 'the biggest Max ever'. This version incorporated arch-vis specialised Max Design into base software and introduced Max Creation Graph.

2016

3ds Max 2017 is released and it introduced Autodesk's Raytracer Renderer as standard to make 3ds Max fall in line with Autodesk's other products.

ESSENTIAL ENHANCEMENTS

On top of the brand-new marquee additions to 3ds Max 2017, Autodesk has also worked to enhance existing tools to create a more streamlined, more powerful experience. We've outlined the key enhancements here, but the best thing to do would obviously be to go hands-on yourself and experiment with all the new speed and power you have to play with.

ANIMATION

- Animation productivity – these enhancements include new tools for manipulating key values and times, as well as copy, paste and reset abilities in Motion Panel list controllers
- Text tool – after originally appearing in 3ds Max 2016 Ext 1, the Text tool now includes bevel and animation presets, custom value strings for displaying custom info text and you can now apply textures, animations and effects to text that automatically updates when you change the content

MODELLING & TEXTURING

- Object tool – lots of enhancements here, but key changes include a single hotkey for opening a sub-object mode. You can now make point-to-point selections by holding Shift, you can also use Working Pivot without navigating to the hierarchy panel and you can enjoy more predictable results when applying transforms to sub-objects by using the new 'local align'
- UV mapping – just your typical performance increase here, which Autodesk claims to make UV navigation and editing between five and ten per cent quicker. Also, texture creation workflows have better performance and consistent toolsets eliminate editing steps, speeding up your workflow

UI & WORKFLOW

- Max Creation Graph – one of the most interesting additions to 3ds Max over the last few years, the Max Creation Graph has been updated to include new nodes for procedural creation, manipulation and more, plus you can now import bitmap and simulation data
- Scene Explorer and Layer Manager – both of these have enjoyed stability improvements and performance tweaks

> "Looking at the script and number of digital CG characters, we knew that our facial capture would have to pay off"
> **Jason Smith**

ILM GOES

James Clarke speaks with ILM's Jason Smith, Christian Alzmann and Hal Hickel about the challenges and opportunities in bringing the richly imagined world of Warcraft to the movies

Castles and winged beasts, deep forests and magical powers harnessed by sorceror's hands – these are just some of the iconic images synonymous with the high fantasy genre. It's a genre that hasn't always been easy to bring to movie-life.

ILM has played its part in this high-fantasy film tradition, notably with *Dragonslayer* (1981) and *Willow* (1988), and then with *Dragonheart* (1996), *Eragon* (2006) and the recent animated movie *Strange Magic* (2015). With *Warcraft*, ILM has marshalled its resources to realise a story steeped in the visual and dramatic tradition of high fantasy as orcs and humans collide.

Visual effects supervisor Jason Smith begins telling the story of ILM's work on *Warcraft: The Beginning* by explaining the project's appeal for the studio. "We wanted to work with (director) Duncan Jones. We look for people that we want to collaborate with. We're trying to be Duncan Jones's partner along the way. Duncan was so collaborative in setting us up for success." Smith identifies perhaps the major challenge of the film, "It was such a huge amount of character work to hold up as a living, breathing thing. We wanted to push our hair pipeline, mocap and facial capture – it aligned across a wide range." Having identified the appeal of the film as a creative exercise tied into the ever-evolving film-making toolkit, Smith zeroes in on the centrality of the mo-cap process to the studio's work on the film. He notes that *Warcraft* undeniably gave ILM the opportunity for "dealing with CG characters that are central to the story. Looking at the script and number of digital CG characters, we knew that our facial capture would have to pay off."

Animation director Hal Hickel reaffirms ILM's commitment to *Warcraft*, noting the appeal of "opportunities to create digital characters who narratively have shared importance with the live

Digital scans of Toby Kebbell's face were combined with ILM's animation and VFX work for the character Durotan

> "We're getting into this world that many people are familiar with: a certain feel. We want people to feel [like] they are coming home"
> **Christian Alzmann**

TO WAR

action actors." Hickel goes on to emphasise that "The actors bring a lot of consistency to a character." This unity of elements is backed up by visual effects art director Christian Alzmann who identifies that part of *Warcraft*'s appeal resides in "the challenge of trying to make something so stylised fit into a live-action setting."

Alzmann, who started work on the *Warcraft* feature film in December 2013 and was on it until mid-December 2015, flip-flopped between its production and that of ILM's *Star Wars: The Force Awakens*. On *Warcraft*, Alzmann headed a small team of between just two and six artists. He recalls how the task was a very complex one. "Coming onto the project I knew that there was such a [big *Warcraft*] fanbase". He describes *Warcraft* as "the fantasy encyclopedia" and goes on to explain that his team were "in charge of being responsible for the depiction of a very precise thing."

ILM ON SET

Key to ILM's work for *Warcraft* was its presence on set during principal photography. "Our FX supervisors were on set through the entirety of the show and then, for me, I usually could have been there almost the entire shoot, but I had to kind of pick and choose," says Hickel. "In the early stages, I'd be there for how the orcs were acting. Our whole main cast of orcs collectively had the most close-ups and acting range. While they were shooting people, we built the orcs. And then, there was mo-cap work for the battle scenes done on a mo-cap stage in Vancouver." Hickel was able to indicate to the actors playing orcs how their work would translate in digital. "Once everybody got it, that was when I could step away."

CHRISTIAN ALZMANN
Visual effects art director

JASON SMITH
Visual effects supervisor

HAL HICKEL
Animation director

ILM'S OWN TRIBE

Of ILM's crewing up for *Warcraft*, Smith notes that "we didn't structure crewing rigidly. Some artists began to become the experts (on particular creatures and characters)." Hickel supervised a crew of "all in, maybe 40 animators". He notes that the crewing dynamic was fluid in terms of the dedicated animation leads: "Certain animators did heavy-lifting on early shots. For the animation, we had our modellers and riggers getting the orcs ready. The animators get through an average sequence in a matter of weeks. This then goes to digital costume and then to lighting."

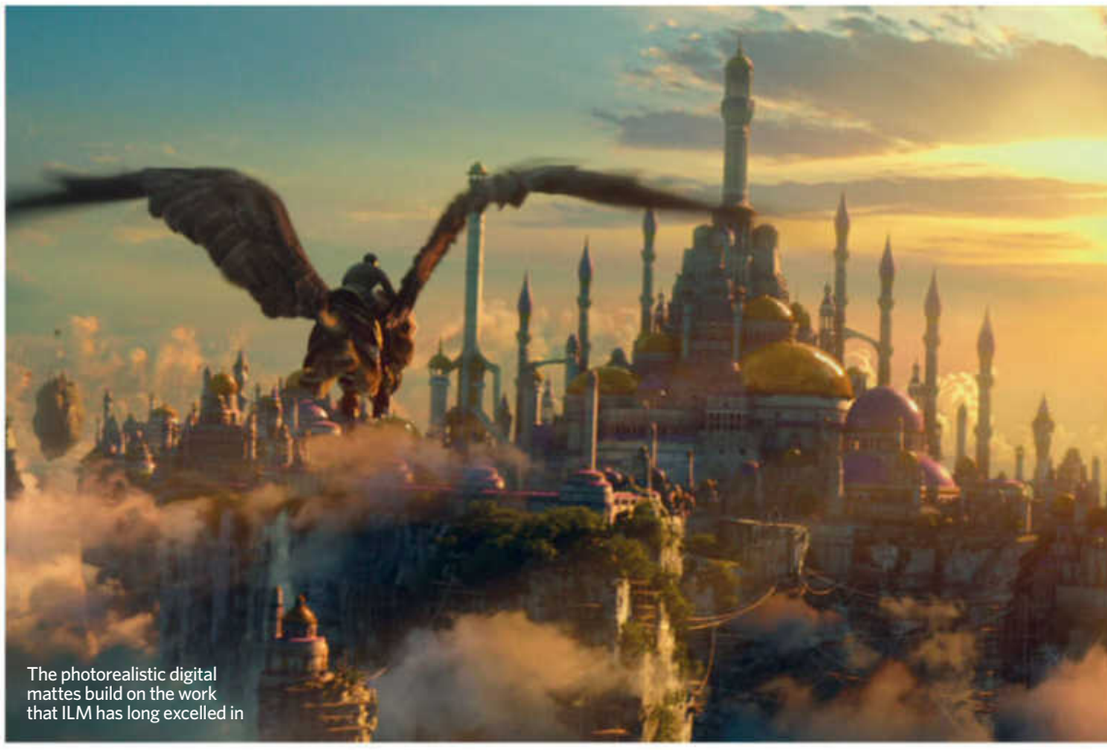
Hickel also recalls, "Once we were in production, shots would go out to whoever was around. That said, I'd cast animators and give them ownership over a group of shots.

"Once we're full on we're doing quite lengthy, dialogue video conferences with Duncan Jones and they can last a couple of hours each, and then he'll come up here in person a couple of times a month. His eye is critical."

Alongside the mo-cap demands of the film, Hickel also references the full animation work created for creatures inhabiting the *Warcraft* world: "We had the big Frostwolves and we looked at a lot of wolf references. For the gryphon, we're looking to raptors and lions."

CAPTURING ORCS

Amidst *Warcraft: The Beginning*'s expansive environments and kinetic action there are also



The photorealistic digital mattes build on the work that ILM has long excelled in

A costumed, live action performance can be easily enhanced by CG

MAKING WARCRAFT WORK AS A MOVIE

Christian Alzmann reveals the thought process behind how ILM translated a videogame franchise into Hollywood film

"On *Warcraft*, you had one art department working on sets, and the characters were designed by Blizzard. We looked at all the renditions of the character through the years. We went into the history of the characters. We're always chasing photoreal. When you've got a videogame franchise, the resolution of those characters on a computer screen means you have to do drastic things to differentiate them. That's what everyone fell in love with," he tells us.

He recalls his team asking fundamental questions about believability in order to translate the game's character designs to film: "'Can we really make big spiky shoulder pads in the game work in the film? Can we scale it back but look more realistic?' One of my first concerns was: once we get an orc and a human talking to each other, can they live on the same screen?'"

Animation, digital costume and live action was crucial for mo-capped characters

Key to ILM's work was the evolving dynamic of mocap and animation

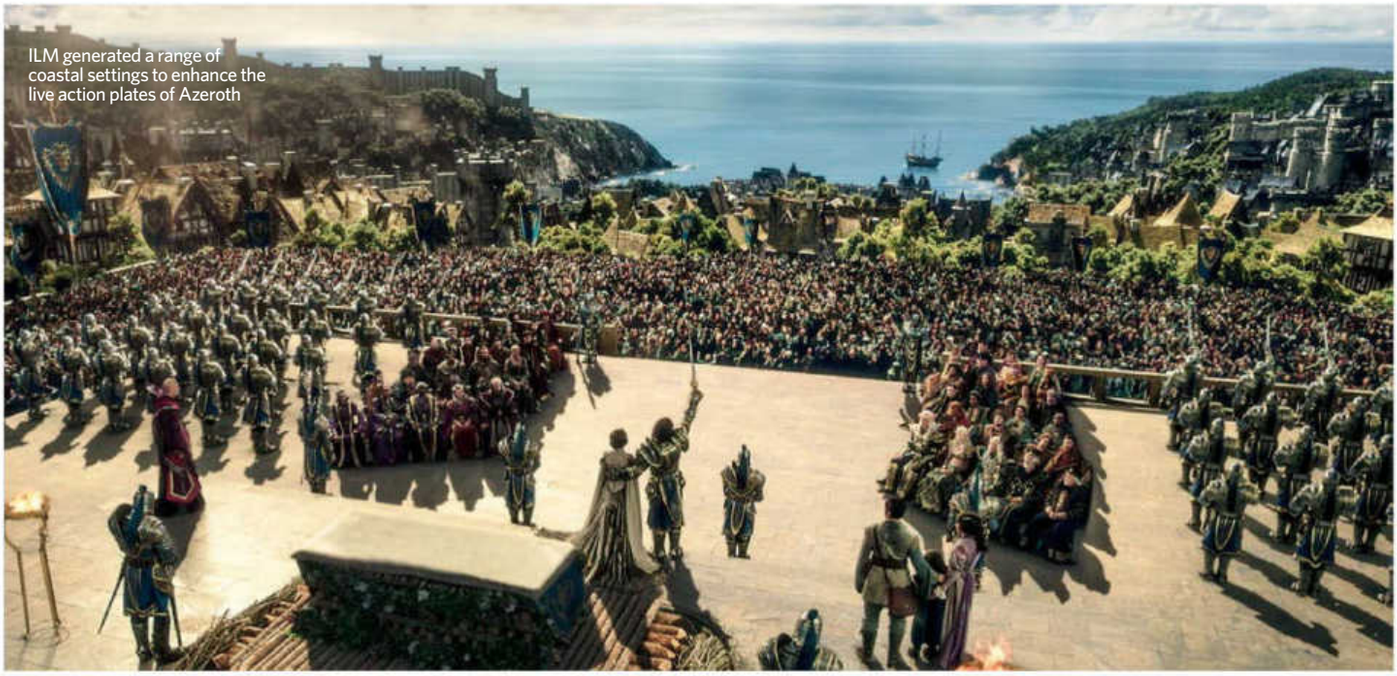
opportunities for the story to mellow out and dwell a little more on quieter moments of character interaction. It's an opportunity that ILM embraced, as Smith explains. "We're talking about a family sitting around a campfire chatting and tiny nuances of performance". Alzmann also notes that: "[There are] moments in the film, some of the really sensitive action that the orcs do and Durotan especially, for me, that are uncanny. Knowing that these orcs are going to have extreme close-ups and dialogue, our goal was to make these characters as engaging as the real human characters."

An issue of creative trust between actors and ILM characterised the work and Smith describes this leading to "a kind of consistency across a character." Smith underlines how ILM "didn't want actors to feel like placeholders and Duncan bought into that idea". Smith then makes an old-school analogy to explain the aesthetic behind the mo-cap work – he references foam latex makeup techniques: "The actors can feel like they're trying to show feelings but it's getting lost through CG. Our role is to make that 'foam latex' as thin as possible and work with the face that the actor has. I mentioned this analogy to the crew; that we're creating an adjustment on top of the performance." Hickel underscores this approach, "There's an interpretive amount of work to reimagine the actors' performances as the orcs. Working out the intention of the actors is key." Smith adds, "Part of our process was that we don't just simply go directly from mocap to the creature: we solve that capture onto a digital double (of the actor) and then there's a separate transfer onto the creature."

Key to selling the illusion of the mo-cap work was the expressivity of the orcs' eyes. "As human creatures we are sensitive to eyes," explains Smith. "I might be able to read a one or two pixel adjustment of an eyelid – Photoshop can change everything. We developed new methods for tracking the eyes on the actor: every eye dart, every eyelid motion. If we get eye direction off just a small amount we can really throw things off." Refining the believability of light interacting with eyes also enhanced the performances and this detailed work was consistent with ILM's overarching ambition. As Smith describes it, "Our whole goal was: how do we push the technology?" For ILM, an essential part of the process was to generate mo-cap data that was very defined before artists added their own aesthetic decisions.

Hal Hickel goes on to address the fundamental creative challenge, "The difficulty on (*Warcraft*) is that the orcs are human enough, so getting through the uncanny valley and making sure [there is] thinking and feeling between the eyes, the audience just buys that as a character – that's a million decisions day by day."

The digital work on the orcs was enhanced by a range of 'traditional' elements. Hickel recalls the



ILM generated a range of coastal settings to enhance the live action plates of Azeroth

A wide panoramic photo of ILM and Lucasfilm's offices in San Francisco

work of their great movement coach, Terry Notary. Each actor went through "orc boot camp. Terry's guidance of the actors and their performance were the heart and soul of the characters. Every movie that uses mocap uses it differently. On *Warcraft*, our intention was to treat the mo-cap performances as 'they are what you get'. The choices the actor makes are what you walk away with." For Hickel this means that ILM is able to "preserve what the actor has done". He notes that there's "not much slicing and dicing from different takes. Duncan Jones selected the takes that he liked and cut them together."

WORLD-BUILDING CRAFT

In tandem with ILM's character animation work, the studio also continued its long tradition of rendering dazzling, otherworldly environments for the movie. Smith talks about the influence of a painterly tradition on the look developed for ILM's environment work on the film and he explains: "When you tiptoe into that fantasy world you find that you can be in this storybook world – an entire Elwynn forest set was built. We know what the lighting is. The scale is pushed on everything. The mountains will have the *Warcraft* aesthetic. One thing about the environments and our central characters is that we're getting into this world that many people are familiar with: a certain feel. We want people to feel they are coming home: that the film is the cinematic equivalent." Alzmann quickly develops the point, explaining that "things tend to be pushed in the design on high fantasy. The landscape has that super fantasy aesthetic, and has to feel real and that is a challenge."

FUTURE VISION

Given the extent of the memorably expressive digital character work ILM has been creating since the mid-Eighties with its work on *Young Sherlock Holmes* (1985), Smith makes the point that "we're still a burgeoning art".

As our conversation comes to a conclusion, Hickel points out what he considers as key in the future evolution of visual effects. "I definitely feel the very dramatic improvement of facial capture: showing a character just sitting still and thinking." Of faces in repose, he adds, "that's a real step forward. That's what improved facial capture is going to be."

Endeavouring to encapsulate what the massive *Warcraft* experience has meant for ILM as a whole, Alzmann enthuses that "everything from fantasy that you can think of is in this. It's such a big movie. You want the viewer to go 'Yeah, that's totally *Warcraft*.'" *Warcraft: The Beginning* is in cinemas now.

BACK TO THE DRAWING HORDE

Designing and animating an entire crowd is no easy task. Christian Alzmann and Hal Hickel take us through how they did it

Key to the ILM art department's creative work in expanding the orc culture originated in Blizzard's own lead character designs. Alzmann reveals their techniques: "You've got a whole orc horde and we designed a lot of the midground and background clans and that was a really good introduction to the design language of *Warcraft*.

"We used real, existing tribes and cultural references and we amortised that into our hero characters. There's a lot of great nuance."

In turn, this character work on the orc clans was brought to life via the mo-cap work that was supervised by Hal Hickel. "I haven't done an awful lot of films with crowds on this scale," he says. "I supervised crowd capture sessions at Animatrik in Vancouver, from the very granular slashes left and right through to the vignettes for a specific choreography."

OVERCLOCKERS UK

RENDA

PROFESSIONAL WORKSTATIONS

5 YEAR WARRANTY · BUILT & STRESS TESTED · CONFIGURABLE · ENGINEERED BY THE EXPERTS

WWW.OVERCLOCKERS.CO.UK/**RENDA**

IDEA · DESIGN · **RENDA**

Featuring watercooled overclocked workstations

Sculpt a complex scene with multiple characters

REZA SEDGHI
Medusa on Her Throne, 2015

Software
ZBrush, Marvelous Designer, KeyShot, Photoshop

Learn how to
- Create a 3D illustration
- Sculpt stone-like characters
- Pose characters
- Texture in ZBrush
- Set up renders in KeyShot
- Composite an image in Photoshop

Concept
I was told to create a 3D illustration for a videogame which shows the power of Medusa. I decided to also show her sorrow for losing her beauty and hair, and stick to the original myth more.

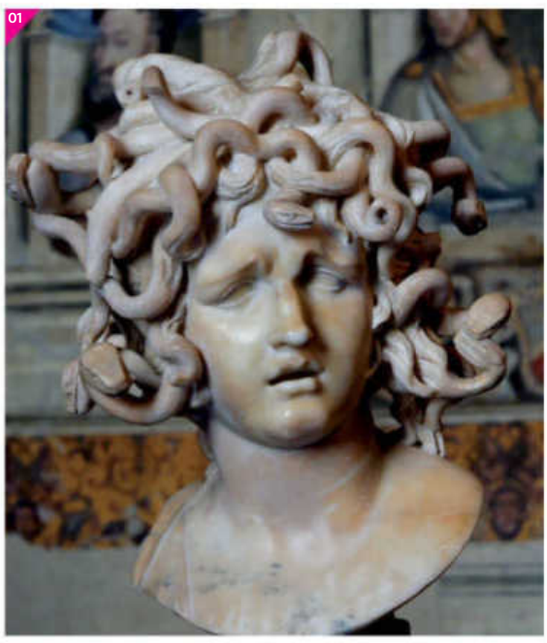
YOUR FREE DOWNLOADS from **filesilo.co.uk/3dartist**
- Tutorial screenshots

This Illustration of Medusa sitting on her throne was created for a videogame. To re-create this render, we will do some early sketches in ZBrush, then do character sculpting, posing and finally render our entire scene. We then use ZBrush for texturing our characters, clothes and the scene, too. We will also utilise the KeyShot Bridge for sending our scene for render and finally, we'll use Photoshop for composing and finalising our final image.

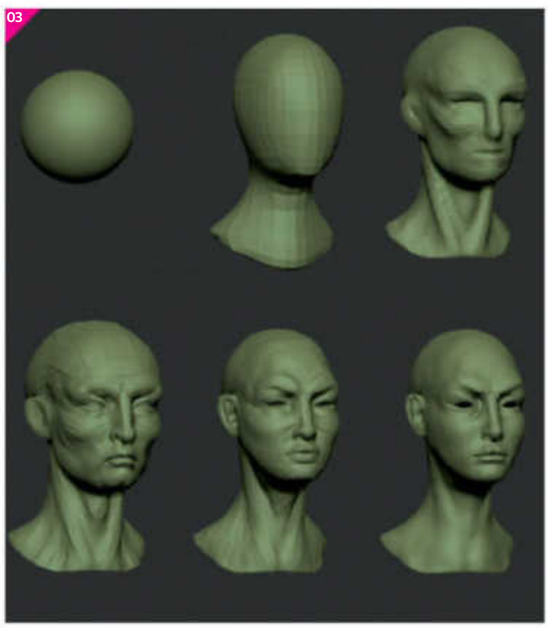
01 Get an idea and gather your references This tutorial was created for a poster for a 'working title' videogame, so it was decided to create work based on Medusa. For the references we will try to stick more to the original myth, to create a different look. In the myth, it was said that not only did Medusa's hair turn into snakes and her eyes were cursed but also that her beauty was taken. Medusa is seen nowadays as a more sexualised and beautiful figure, so we will try to create an alternative face of Medusa.

02 Roughly sketch the whole scene We start sketching the scene in ZBrush by placing and developing the models to create the overall forms of the characters and environment. This is so we can know our view, perspective, forms of characters, frame box and simply block everything in our illustration.

03 Create Medusa's face First we'll start with a DynaMeshed sphere, deforming it to achieve what we need. We'll sculpt several types of heads to see which suits the most and which one has the best emotion and feelings. We will use Javier Marin's Medusa sculpture as our main reference and sculpt our Medusa's face based on the sculpture slightly.

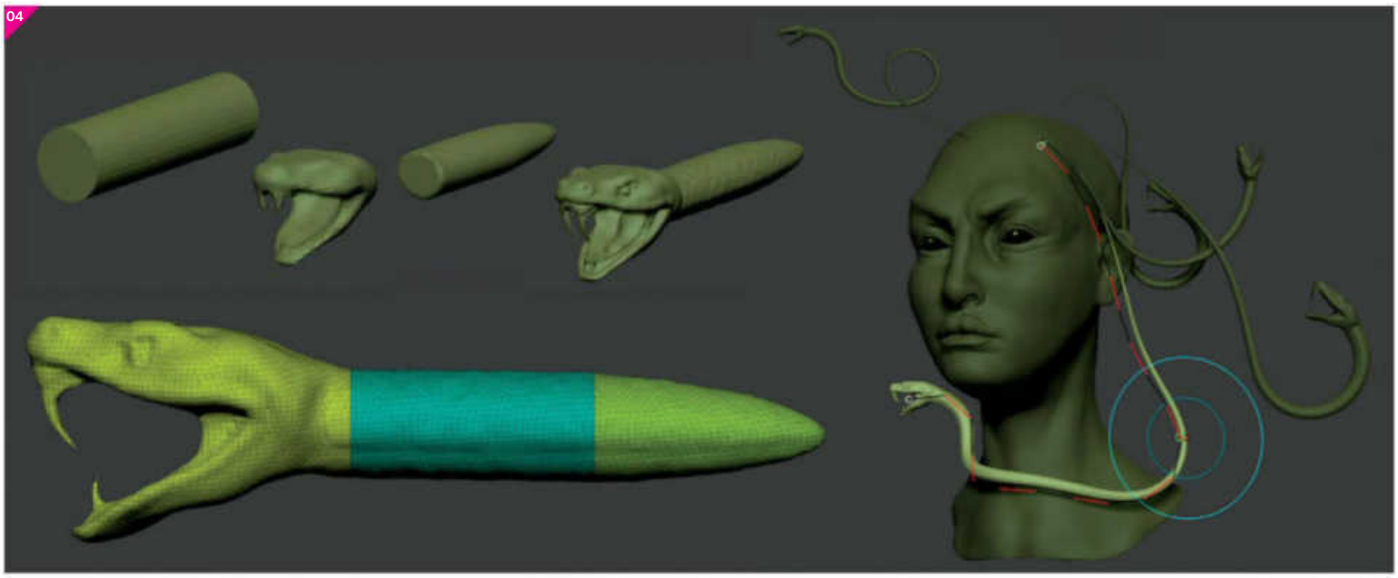

01

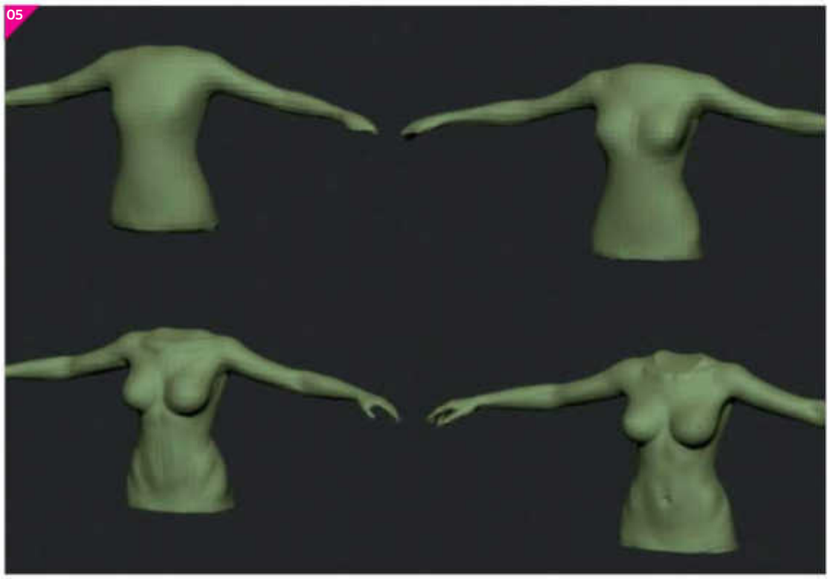
02


03

Sculpting process
At this stage, we mainly focus on sculpting and creating the assets for Medusa and posing our characters to reach the forms and style that we are going to need. We will create a bust to create more details on the head and then create a T-posed base mesh for our character. Later we'll merge them together. By masking areas, we will get the pose that we want.

> We start sketching the scene in ZBrush by placing and developing the models to create the overall forms of the characters and environment





04 Create Hair Brush for Medusa For the hair we will create a snake. Using Slice Curve will create a cut in your model's topology and change the polygroup of that part. It needs to be three polygroups: the head, the body and the tail. The body needs to be tiled, so you will have to match the beginning of it with the end. Once we're done, we'll go to Brush>Create Insert MultiMesh. You should then go to Stroke, turn on the Curve mode, go to Brush Modifiers, and turn on Weld Points and Stretch. Then set Overlap to 0.01 and set the Curve Res to 10.

05 Develop Medusa's body For the body we'll make two pieces: upper and lower. For the upper part, we'll start to create the body with a DynaMeshed sphere. Start the deformations to achieve the look that we need. Later we'll subdivide it and give it some small details. For the lower part, as it's a snake tail we'll add a cylinder to the bottom. Turn the DynaMesh on and now you can start sculpting the snake body. To create the snake's scales, the use of alphas in the Pixologic library is highly recommended.

06 Sculpt Medusa's armour For the armour, we'll mask parts that we need and extract them as separate objects – now we can sculpt them freely. Always remember to create something that brings culture, something that has a back story and supports the story behind your character. For Medusa we'll try doing armour that has snake designs to show more of her snake form. Snake designs, in armour and jewellery, were seen a lot in Ancient Greece and adding these snake details will make our character look more mythical. We'll then use our snake brush for creating bracelets and necklaces.

Being smart when adding details

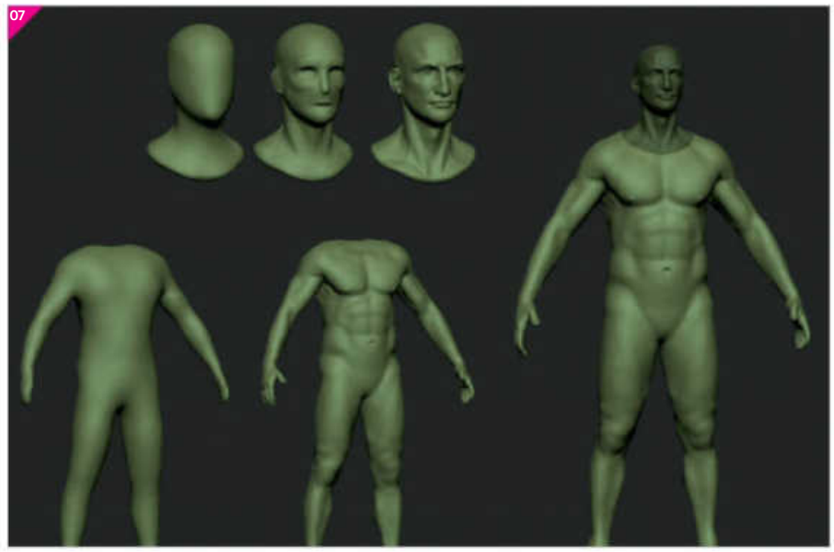
A trick for adding lots of details on a mesh without making it busy is to refrain from adding big shapes on the surfaces. Try to add these details on the sides of the meshes or, if you add it on the surface, make it small and subtle. Ensure you check your model as a whole often to make sure you are not overdoing it.

07 Create a base mesh for statues For creating the stoned soldiers, we need a base mesh for developing our characters faster. We start by creating a bust with a Classical look; looking at Ancient Greek and Roman sculptures can be a great reference point. The reason that we've created the bust first is to have more control while sculpting. After we're done sculpting the bust, we will add that to the body, merge the SubTools, re-DynaMesh it and now we will have a single Classical-style base mesh.

08 Sculpt the stoned soldiers Now that our base mesh is ready we will start developing the characters. First, we will create the style and look of each character individually and later get them into the pose that we want. To create the armour we will mask the area that we need, extract it to have a separate SubTool, turn DynaMesh on and start sculpting. For sculpting clothes we'll use Ben Selwy's amazing clothes brush, which is free for download from the internet. HPolish and Pinch are great brushes for creating sharp forms. After the sculpting is done, ClayPolish will be great for adding more sharpness to your mesh.

09 Add destructions to the statues Before we do anything else, we need to do some texture work to create a stone look. The main brushes that we'll use here are Michael Dunnam's Great XMD Brushes, which are totally useful at this stage both for creating a stone look and for creating damage and cracks. You can also use Dam_Standard in some parts to create unique damage and later pinch it to make it look sharp.

10 Pose Medusa Once our main models are done and our throne has been created, we'll go for posing Medusa. The pose should define her pride, power and sadness at the same time. As we've made our model low res with polygroups, we will have a better control over transformations and rotations on our model. We'll select each part and then go on to posing them. Once the upper body is finished we'll go on to working on the lower part/snake tail.



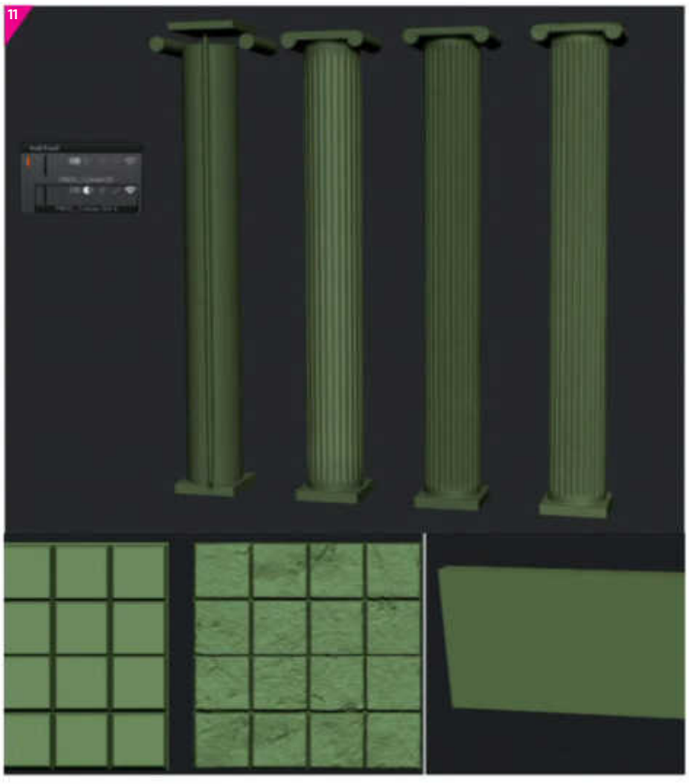
11 Create the environment To make the environment look like what we sketched earlier, we'll try to create a cave that was once a great palace but is now a ruin. Always look for as many references as you can, as they can give you so many ideas. For creating the ground, we'll create four boxes and start detailing it to create our tiled ground. Merge the SubTools, duplicate them and start creating the ground. For the walls, we'll start using ClayBuildup to bring our main forms in and later use alphas for detailing and creating a stone look. Use a cylinder for the column's main part and a DynaMesh for the upper and lower parts.

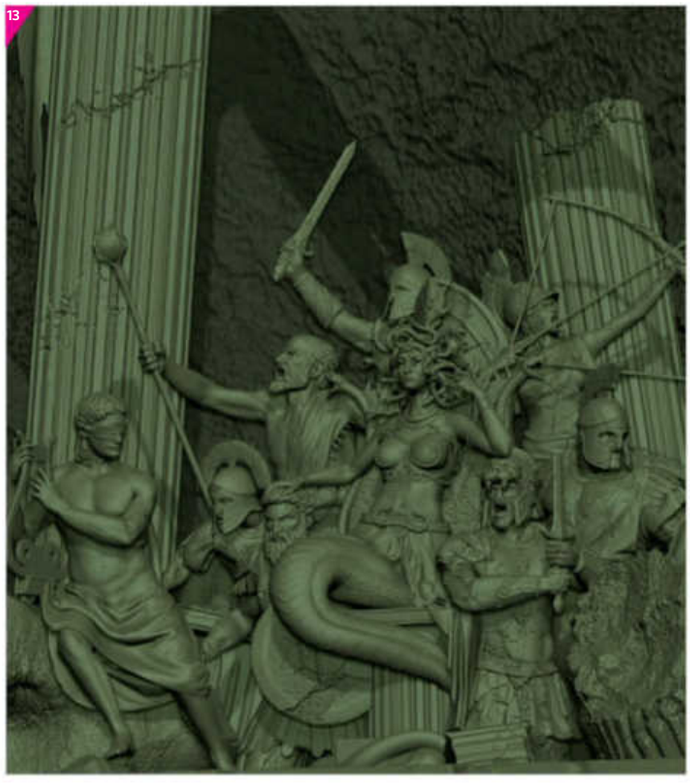
12 The lyre player To create more of a story and to fill more space, we'll sculpt a man who's playing music and his eyes has been shut so that he won't be turned into stone. For creating the cloth on his body, we'll use Marvelous Designer, which will give the best result in the fastest time. You can look for references of Classical paintings of music players, as they will give you an idea of how to pose your character.

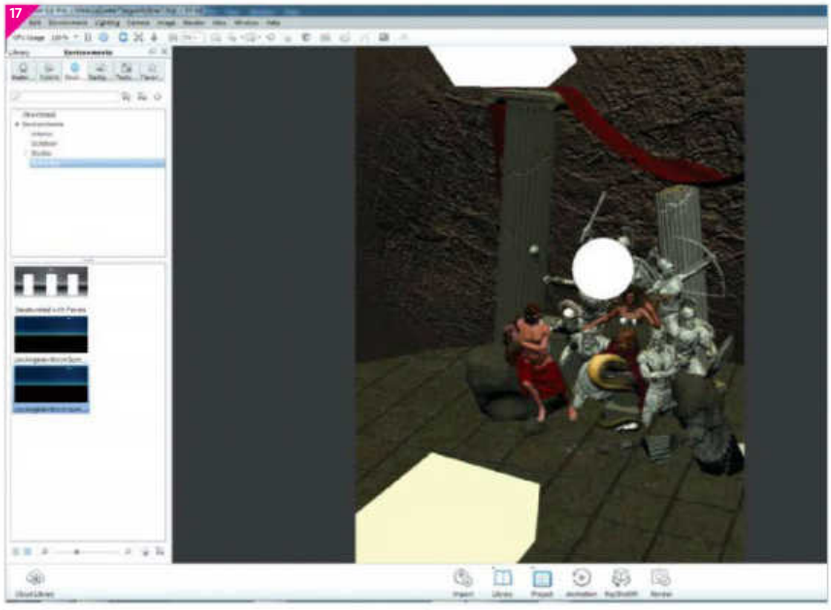
13 Refine and finalise Once we've done everything, we can go on to polishing parts, moving parts into better places to set up our final illustration in this way. Try to make the throne and Medusa in a triangular shape to show more majesty and grandeur.

Finalising the illustration

This is the part where we need to finalise our sculpting and go to the texturing stage so that we can send our scene to KeyShot for rendering. Some models during texturing should get a proper material, such as the environmental props, and KeyShot will create a stone look based on this material.







14 Texture the model Polypaint gives us the fastest result based on our art style. First take a shot from your illustration, send it to Photoshop and do the colour test to know exactly which colours you are going to use on each model. After that, go back to ZBrush and use the Pen A brush to paint your models. In the masking section, the cavity mask and the AO mask are really helpful to mask the areas based on your cavity or AO as they let you paint different parts with more control. Use AO masking for mostly painting the shadows.

15 Further texturing We'll use the method mentioned above for other models too. Armour parts don't need to have too much colouring as most of it will be done by a proper MatCap, which you can find online. For the ambient occlusions and darker areas, avoid black colours and try picking a darker shade of your colour. Black colour variations will give your model a dirty look. Desaturation is fine if you pick the colours in a way that doesn't make your model look dead but cold.

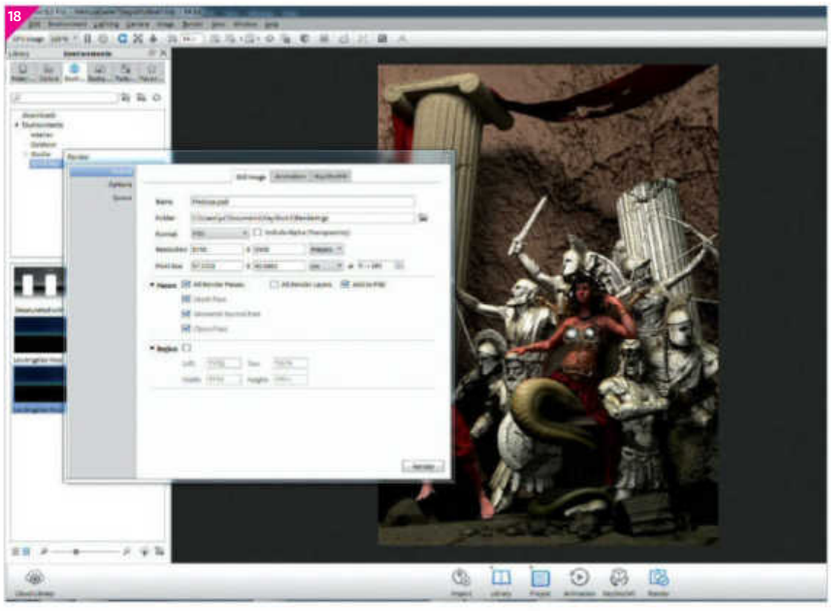
16 Import and set up materials Once we've finished everything in ZBrush, we'll use the ZBrush to KeyShot Bridge to send our model and prepare it for rendering. As our model was imported, we'll go with changing the materials for each part. The KeyShot skin shader is good for the Medusa and the music player. For the metal parts you can use a simple matte grey material and for the stones, a simple grey material is fine because we already have our Polypaints on the model.

17 Light in KeyShot Most of our lighting is based on the HDRI for lightening up our scene. We'll use a sphere for more lights, which you can add using the Edit menu. Make its material a light material and move it to the back to create the rim light and a main light to create more light in the front. Remember to set the settings to full simulation to get the best result from your lighting.

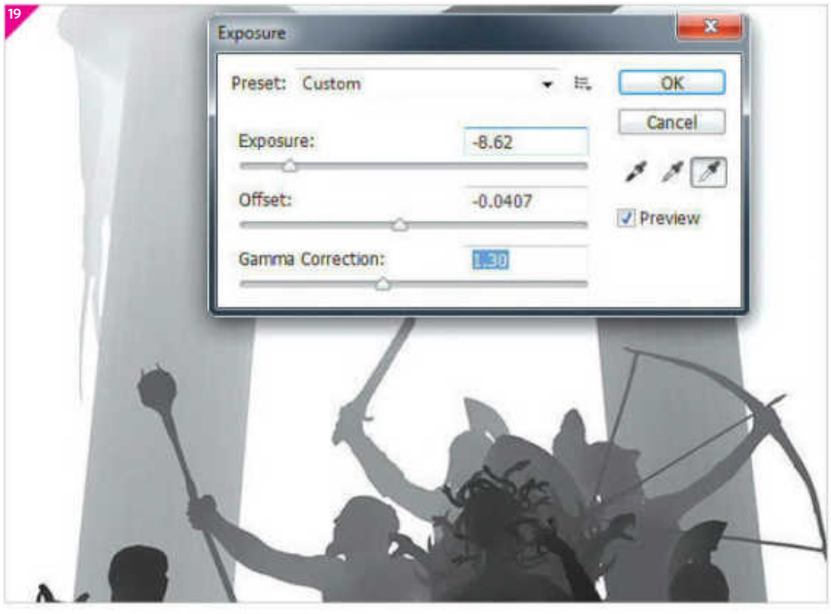
Rendering a 3D illustration

The ZBrush to KeyShot Bridge enables us to send our ZBrush MatCaps to KeyShot. This feature will make a lot of things easier. As we've set our MatCaps on each model we just need to edit the parameters in KeyShot's Materials to get a better look for each model. Medusa's material should be translucent as we are creating a skin look, other materials can be matte grey to create a stone look.

18 Set up KeyShot Rendering with KeyShot is really simple. You can add a camera in the camera bar and lock it so you won't be worried that it might change, just in case you want to do any further work on your scene. Use depth of field to blur out both the foreground and background so you can focus on your main models. Set a high resolution for your render so you'll have all of your details rendered. Make sure to check All Render Passes so that you'll get every pass that KeyShot can provide. Once we've set up everything we will move on to the rendering.



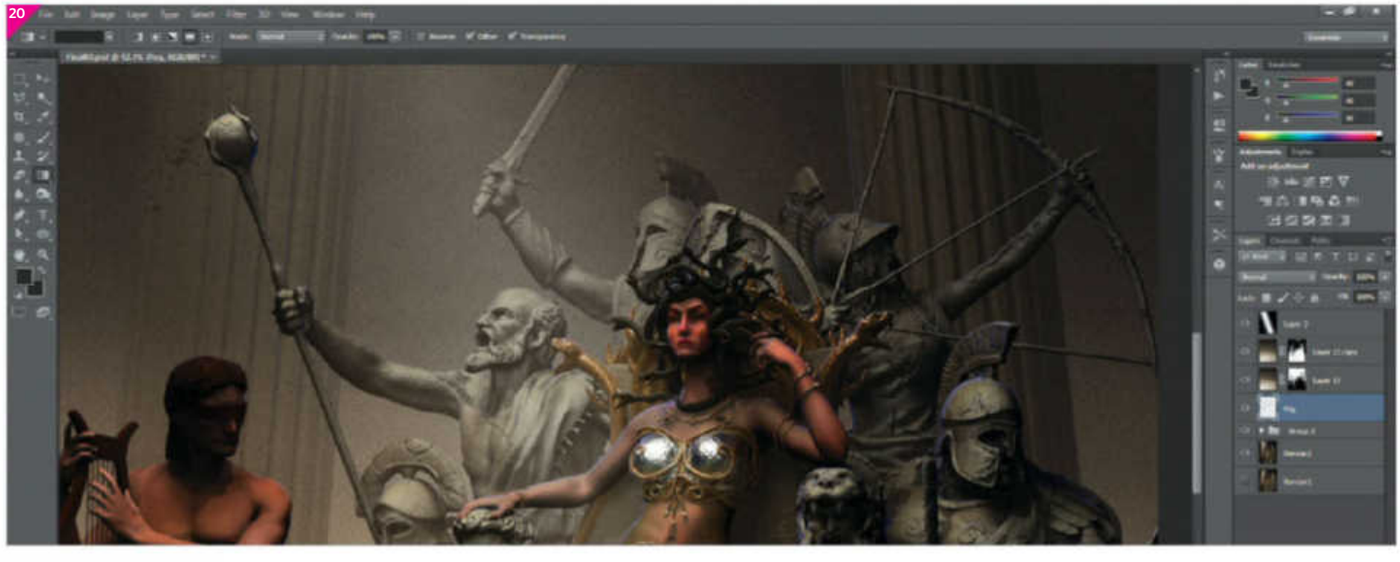
19 Tweak the scene in Photoshop Open Depth in Photoshop and go to Exposure to create our depth map. Editing the exposure's parameters will provide us with the depth that we need, we'll use the depth map mostly for masking and creating the depth. Inverting the depth will provide us with a mask for our background, too. Change the depth layer mode to Multiply so that we'll have a darker background. Import some fog images with a transparent background, and use it on your foreground and background with your depth map as the mask layer so that it will not be a one-piece fog image all over your scene.



20 Work on the image in post-production We'll colour correct and edit the levels of our image now to achieve a better result. We'll duplicate our image layer, use the depth as a mask layer and give it a blur effect to get blurred edges. Now simply erase parts that we don't need to be blurred. Create a white-to-grey gradient map in a new layer to lighten up the top areas. You can download some dust particle images to add a more dusty look. Now it's all about cleaning up and doing some colour corrections to achieve the final image that you need.

More lighting methods

For more improvisations in your 3D scene, you can add Overlay or Soft Light modes on your images to create a more eye-catching look. A black-and-white gradient map with a Lighten or Screen Layer mode can work great for lightening up the areas you need to focus more on.



24/7 support

GarageFarm.NET

GarageFarm.NET is a render farm made by 3D artists for 3D artists.

As 3D professionals, we understand the biggest problems in 3D rendering:

Rendering is a long process and can be unpredictably time consuming and on occasions, frustrating.

Buying or renting nodes is expensive, but commercial render farms are not cheap either.

Preparing scenes and uploading files can be bothersome and time consuming.

We have over 300 energy efficient nodes and an in house developed software package.

We created software that allows sending files with one click directly from your 3D app to our farm. It's user-friendly and quick.

We offer three different priority packages. With the highest priority you get ahead of the queue to render faster. With the lowest priority the rendering might take a bit longer, but you will get the best deal possible.

Autodesk 3ds Max, Autodesk Maya, The Foundry MODO, NewTek LightWave, E-On Vue, Softimage, Blender, NVidia CUDA, Planetside Terragen

Skype garage.farm
KakaoTalk: garagefarm
NateOn: garagefarm@nate.com
Line ID: garagefarm.net

Korea - 00 82 109 511 8937
US - 00 1 424 777 2424
UK - 00 44 208 144 7772

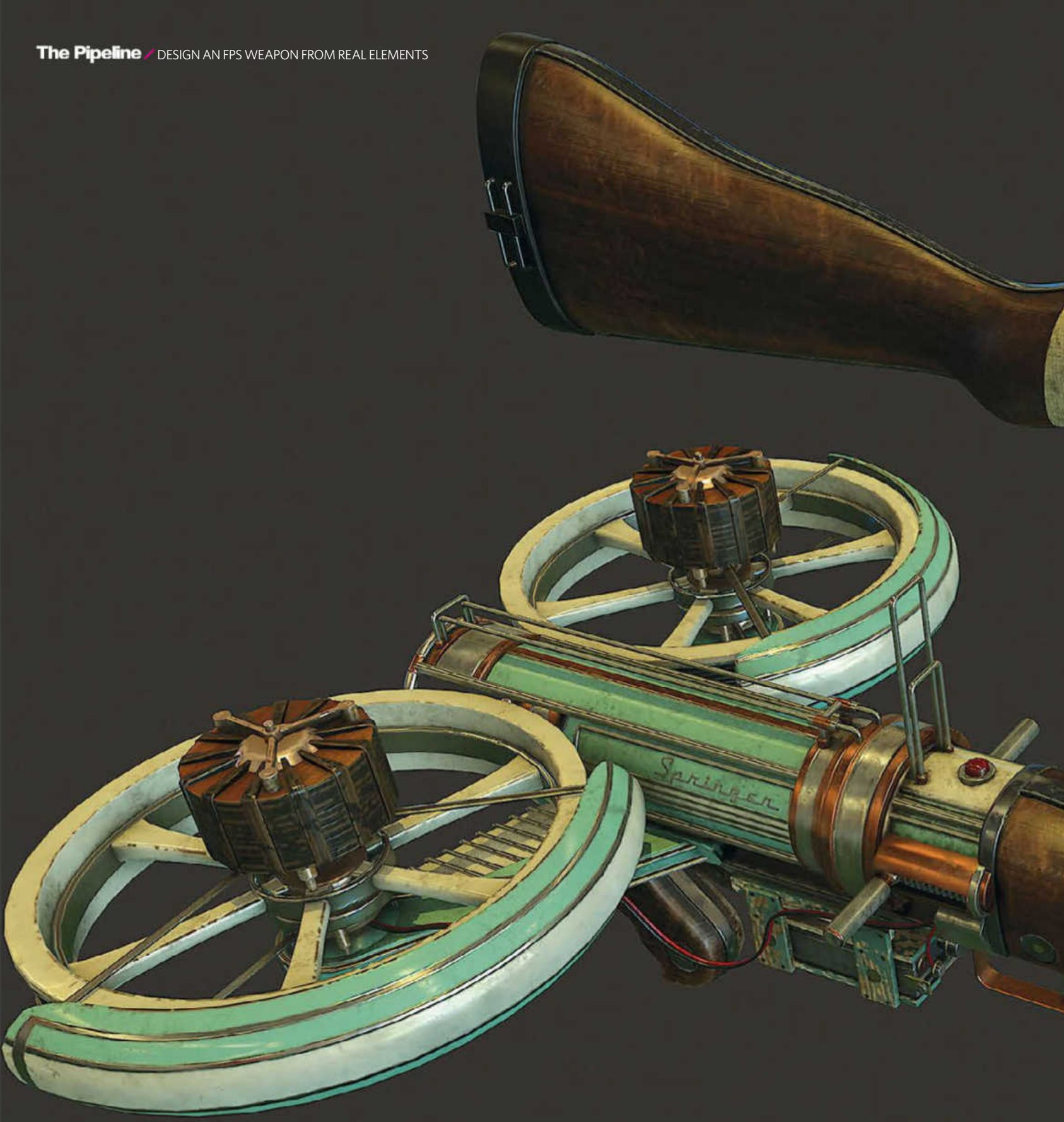
garage@garagefarm.net

http://www.GarageFarm.NET
https://garage.farm/forum/

Free Rendering! **Coupon Code: MAG 01**

Coupon Code: MAG 01
For mentioning this coupon code while registering for a Cloud Account on our website we will offer **double free credits** valid for a **free rendering** test. This is a great way to "try before you buy" without commitment.

All trademarks and registered trademarks are the property of their respective owners.


Springer

Design an FPS weapon from real elements

Use real-world functions and design flourishes to create a grounded fictional weapon

We have all seen guns in real life and science fiction, and we all understand their function. In this tutorial we will look at what it takes to combine function and believability with a unique fictional vision. We will look at machinery and style choices from the Fifties and apply them to create a unique weapon. Our idea will be transformed into a 3D model, textured and rendered all within a real-time engine using current-gen-ready polygon counts and texture sizes for a first-person shooter game. Don't be afraid to change the designs and work as you go – you never know what new ideas you can come up with.

> Our idea will be transformed into a 3D model, textured and rendered all within a real-time engine

LOGAN WILLIAMS
Big Thump, 2015

Software

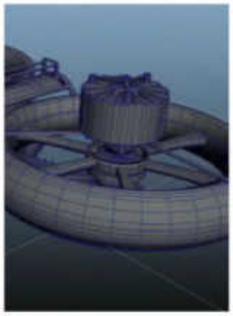
Maya, Substance Painter, Marmoset Toolbag 2, Photoshop

Learn how to

- Model hard surfaces for games
- Texture realistic materials
- Achieve professional videogame rendering

Concept

I wanted to create a grenade launcher that wasn't ballistic but slung grenades out by use of flywheels, using designs from the Fifties.



YOUR FREE DOWNLOADS from **filesilo.co.uk/3dartist**

- Tutorial screenshots

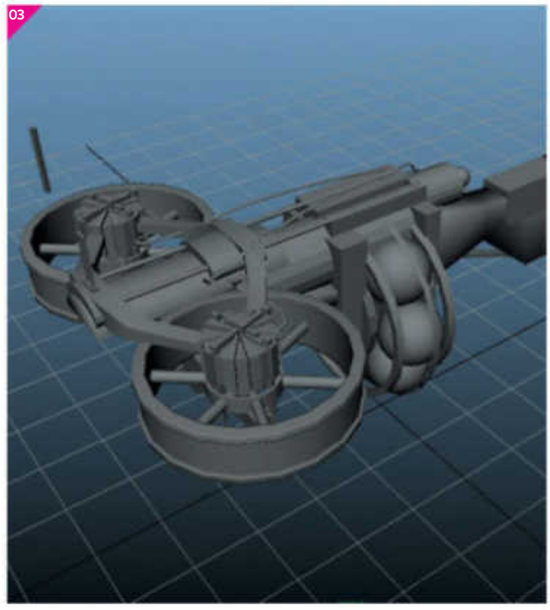
01 Block out your design Blocking is always an important step and can be the most fun. You don't have to worry about technical limitations or boundaries. The main thing we need to focus on is overall shape and how the forms read as a whole. Ask yourself questions like 'is the silhouette balanced?' and 'do the forms play off each other and look stable and connected?'. Your eye is very good at determining believability of an object, even at a glance, so always trust yourself and always question your designs.

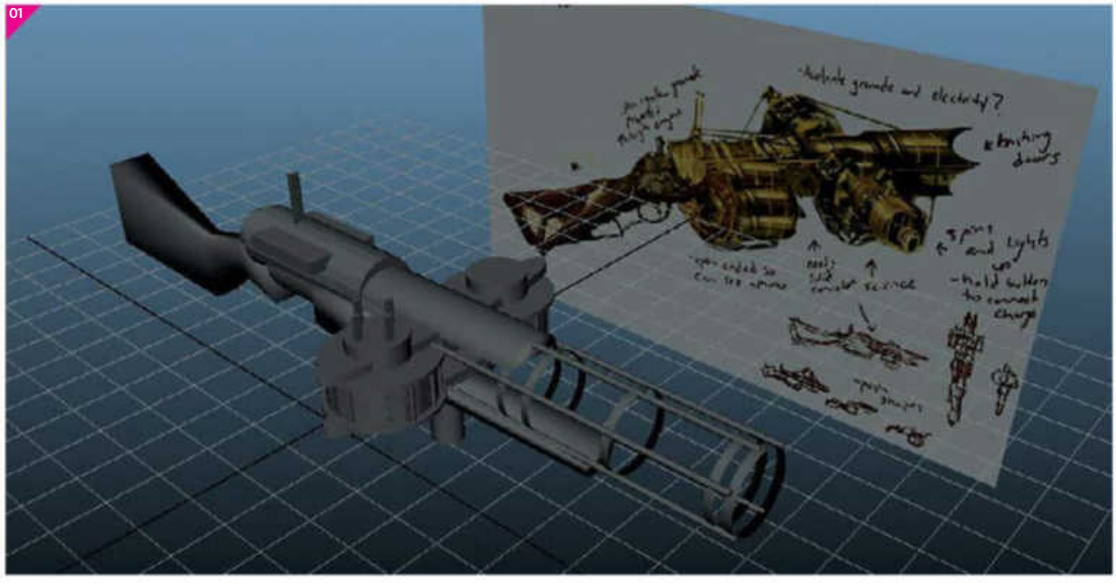
02 Create the function Once you have settled on a big picture idea and the forms are reading decently, start to break it up and think about function. Think about the main areas you need to flesh out. For this model we can break it into the stock and handle, the barrel and the wheels. These are the three areas we can start to focus on in our design by looking at how these areas will fit together and what their function will be. This will later help us come up with secondary and tertiary details to create more interest with the design.

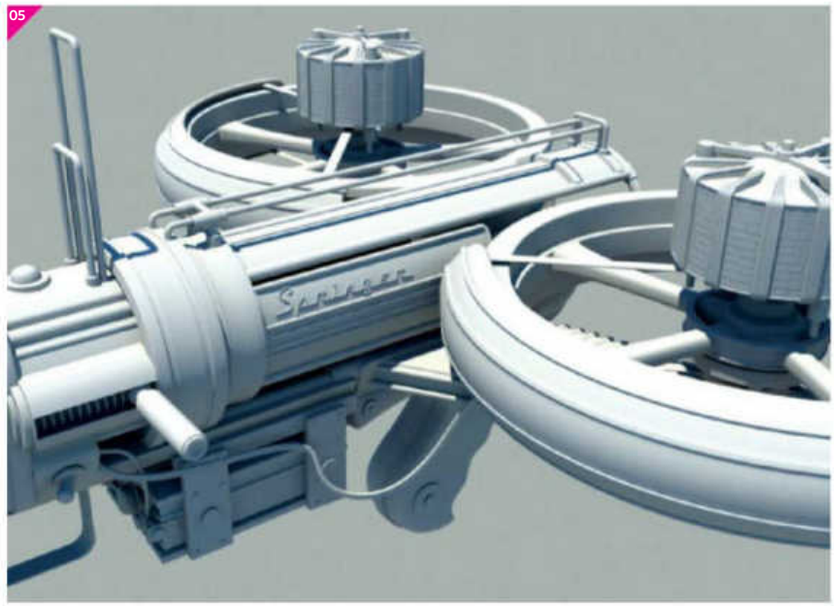
03 Model the barrel Breaking the model down into smaller chunks can help you really dial in on the details and function of that specific part. Always keep a big reference in the background and every aspect should support that. For this model our idea is of a grenade launcher that slings grenades through wheels. The function of the barrel should open to let ammo enter, with a way of getting the grenade forward and thrown by the wheels. Keep forms large and think about how geometry will connect at seams and interact to create nice rounded edges and interlocking shapes.

Take a fresh look

We always like to go with the first idea that we come up with or the first method. Sometimes it is a good idea to push things further than what you may think to achieve a new look on it. With weapons there are tons of possibilities and countless versions of what can be done. Don't be afraid to try new ideas even when you have already started modelling – some of the best choices can happen as you design on the fly.







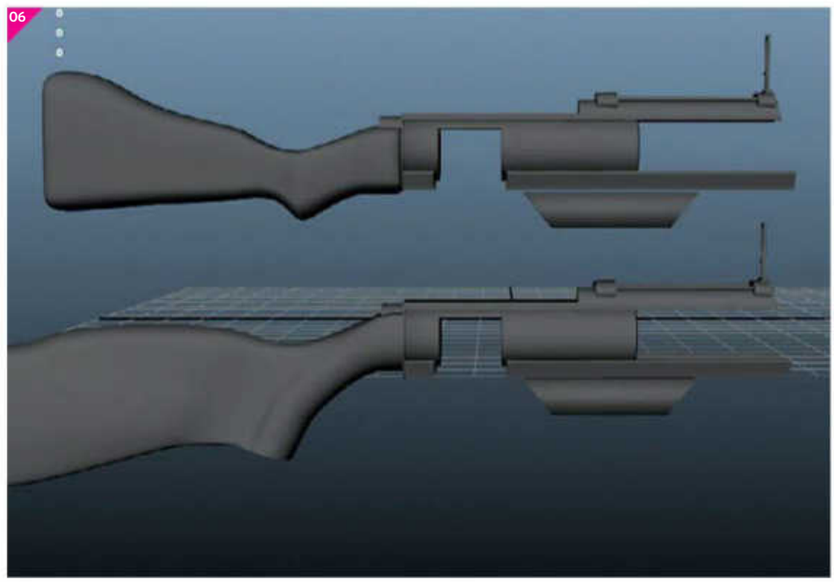
> The wheels need to be protected so [use] an existing function like mudguards from a bicycle

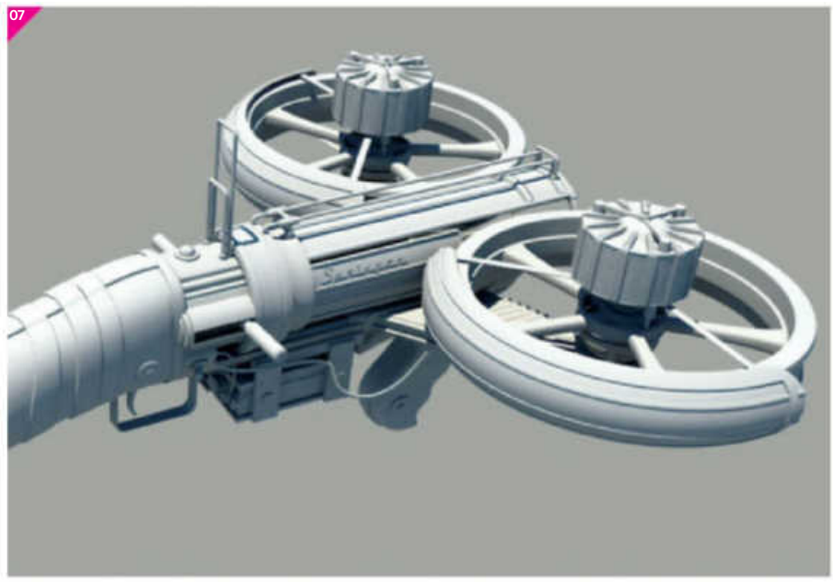
04 Model the wheels It is important with any design to keep it true to itself, the time period it is in and the function. For the wheels we need them to fling the grenades forward and they also have to be powered by some sort of motor that can be turned off and on. With these points we already have a sense of what design choices and models we need to make. The wheels need to be protected so using an existing function like mudguards from a bicycle wheel, we have found a relatable yet interesting design element to add.

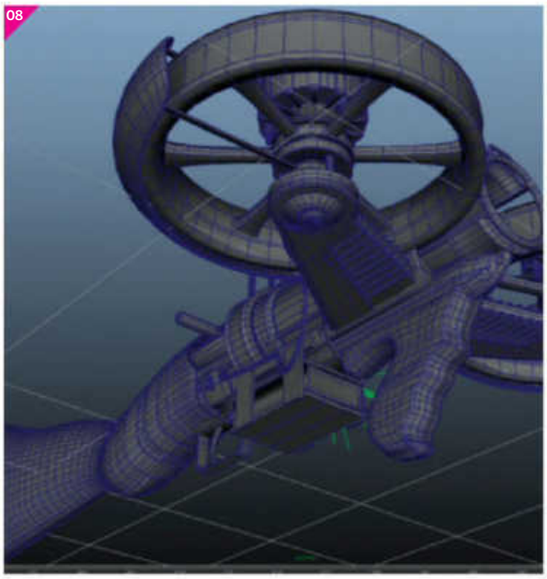
05 Incorporate concepts To create an interesting motor we can look to past inventions or ideas and try to incorporate them. For this look we based a battery motor on a Tesla motor powered by an undermounted battery. Using relatable elements will help your weapon to read the function very easily. A motor, wires and switch help your player to understand what is happening in your design in a very quick and simple way. Some design elements can even promote gameplay, such as new batteries that may be needed for this weapon to function. Have fun with it.

06 Create the stocks and grip The way a weapon is held is the most important element to making it feel grounded and real. Thinking of the function of the weapon helps drive what kind of stock and grip it may require. With our weapon, we are borrowing design elements from real life grenade launchers so using an iconic design will prove beneficial. Having a fore grip not only helps silhouette but can also help push the style. With this we borrowed the classic tommy gun look.

07 Model in high poly Once you have decided on the final look and design we want to create the model as realistic as possible. We want to use the Smooth tool and create bevels and edge loops where needed. A trick with bevels is to always keep them a little wider than what you think, as this helps with normal map baking and reading the forms farther away. Next we will start to UV map and retopologise.







08 Retopology Since we are creating a model for a game engine we will need to create a smaller polygon count version for use in-game. Since this is a current-generation FPS model, we can have a fair amount of detail in the actual geometry. For this we can use outside programs, but Maya Quad Draw and Decimation tools can also work. An important thing to keep in mind is to get more geometry for curves and as little faceting as possible for the silhouette.

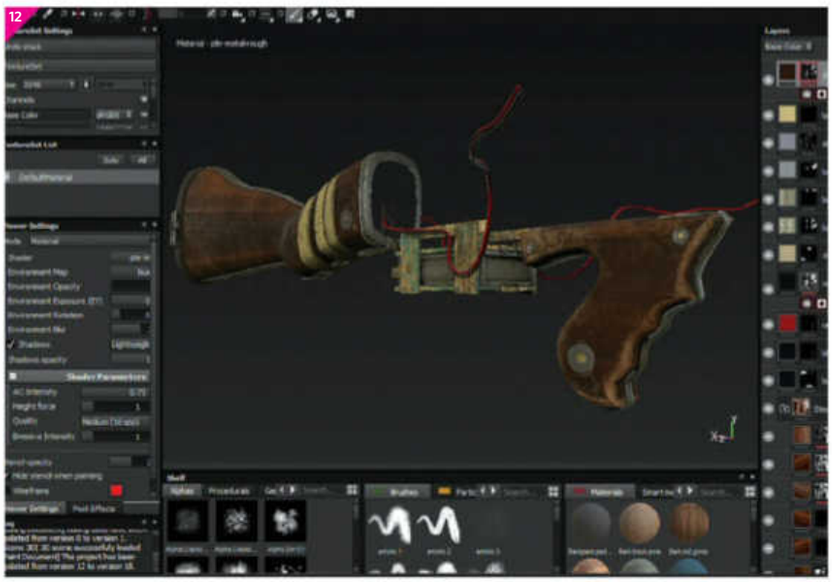
09 Create UV map In terms of presentation we can split the model up to several UV maps. We can think of it in the same terms as the design elements, the barrel, the stock and the wheels. So for this, three UV maps will be created. Try to mirror textures if you can to save UV space, such as with elements that won't be viewed on the screen at the same time. Be careful of where you create UV seams as these can sometime show up in the texturing.

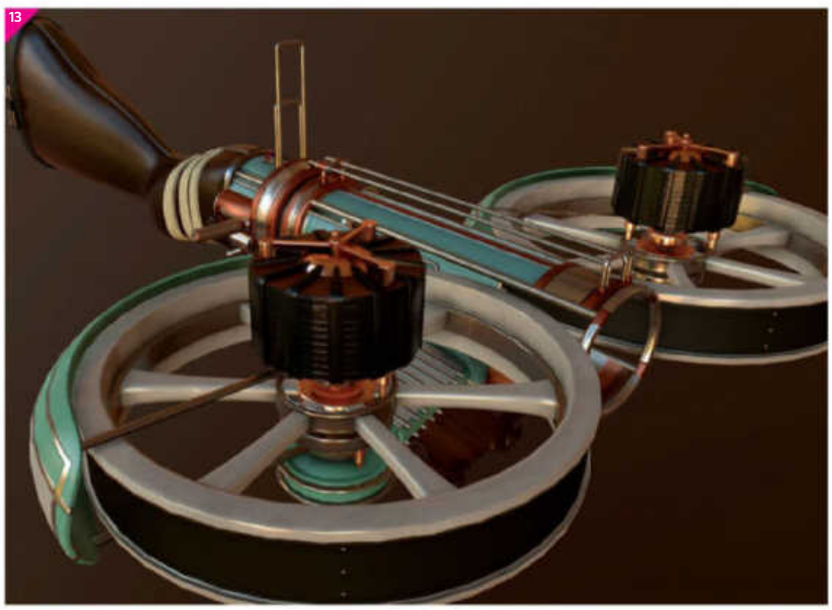
10 Bake details The next step is to separate all the high-polygon and low-polygon geometry. You can use an outside program such as xNormal to bake maps, but for this we will just use Maya. If you are exporting for xNormal be sure the pieces are in the same world space and not overlapping. Adding all the geometry and creating cages will ensure a clean bake for Maya.

Game-ready model

Now that the model is baked down to game resolution you can import it into a game engine and test it out. You can even model the pieces separately and rig the geometry for use in animation for a game engine. The pieces that would be animated for this are the motor switch, the wheels and the barrel sliding forward for ammo to be inserted. Thinking of function like this can help you break up the geometry for later use.

> Since we are creating a model for a game engine we will need to create a smaller polygon count version





Make or break

Texturing is the stage where a lot of models can either be enhanced or completely ruin the design. You want the texturing to showcase the real-world wear it would receive. If the weapon will never be rained on, why is there rust everywhere? The most important things are the subtle layers of glossiness and metallic differences. Nothing in the real world is completely clean, even if you want it to be clean you can give it a little gloss variation for that subtle look. For this, key elements are the worn rubber wheels, worn wood grips and small blemishes on the metal.

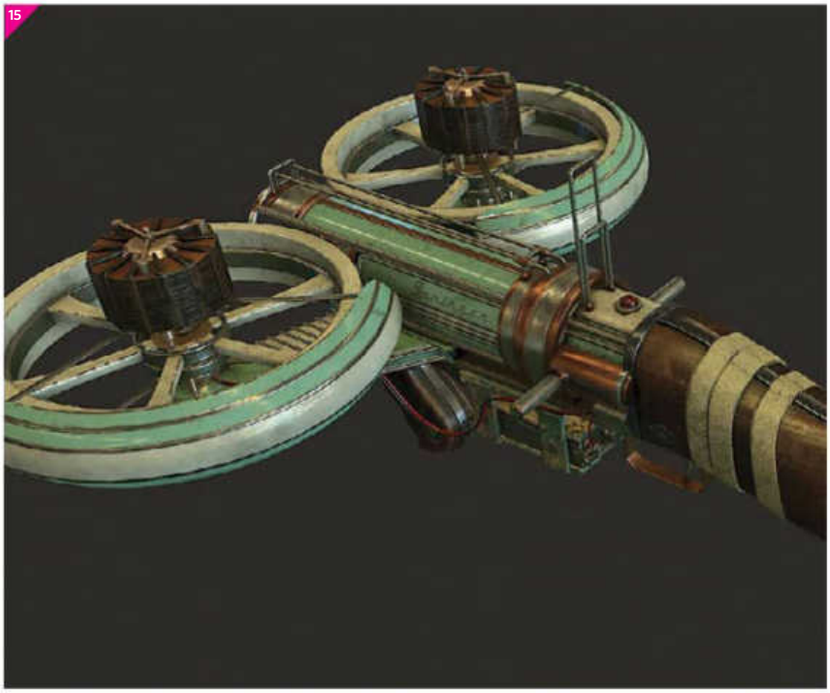
11 **Create Substance** A clean model and clean model bakes will always help drive texturing. Using our normal map bakes we can create an ambient occlusion and curvature map to drive texturing within Substance Painter. Texturing has become a lot easier with programs such as Quixel and Substance, but it is still key not to get carried away and forget design principles as well as real-world materials.

12 **Break down materials** Thinking about what materials things will be is a good place to start. With this model we have rubber, wood, plastic, metals and paint. Within Substance, using alpha masks is the best approach to drive texturing. Alternatively we can even bake out a colour map from Maya and assign different materials to represent the different texture areas in Substance

13 **Texture it new** The easiest approach for texturing is to work in stages. The first stage is to texture the materials, as if it was just made or brand new. This will give you a realistic believable layer of materials. For this look we wanted a nice hot-rod style shininess to it. Using the plastic, copper and metal materials within Substance can provide nice results.

14 **Add wear and tear** This step can be as extreme or subtle as you like. For this model we want a vintage weapon that was once used, but maybe has been dormant in a warehouse for some time. Using the materials and masking within Substance, you can use a few layers of light grime with variations to produce a better look than just one heavy layer. For this we will use Metal Edge Wear, MG Dirt, edge wear and dust. Using a combination of specular and gloss variation will help create believable layers of age.

15 Add final details and decals Having humanistic touches can help make a weapon unique. Think of the time period and what kind of person would be using this weapon – this can help drive your design choices. For this weapon we finish it with a Kilroy insignia, a pin-up girl on the stock and an on/off decal near the switch. Decals can help fill blank space and balance art elements. Don't go overboard, but a few can help push the look that much further.



16 Render and presentation Game-ready models can be imported and rendered right in the game engine or other real-time renderers such as Marmoset 2. To achieve a realistic look, try using a lighting setup that complements the colour palette in the model. You can even think about the environment setting it would be in and see how the textures look in that setting. There wouldn't be shiny metal on a stealthy black ops weapon that needed to be concealed by darkness. For this lighting, we chose an industrial garage with a warm light to complement the cool colour of the environment and weapon.

Showcase

Logan Williams

Logan is always looking to push his imagination and think of new ways to look at the way that we create art from the old and new.

Clock Tower
Maya, Substance Painter, Photoshop (2015)
This is a 3D model based on concept art for *Torment: Tides Of Numenera*. Parts are rendered as a background image and pieces that run real-time in the game engine.

Caldera Rocks
ZBrush, Substance Painter (2015)
Rocks sculpted for the early visualisation of the title *Underworld Ascendant*. The style was meant to convey sweeping dynamic shapes rather then pure realism.

Shipping Container
Maya, Substance Painter, Photoshop (2015)
This game-ready shipping container was a practice in PBR workflow and real-time geometry. A logo and colour scheme would make this great for background set dressing.

"The fastest and easiest way to texture"
- Simon Fox, Blizzard

"Holy shit this is bad ass"
- David Lesperance, Valve

"An essential part of my pipeline"
- Josh Marlow, Epic

Quixel SUITE 2

OUT NOW

www.quixel.se

Scan based PBR painting. Straight in Photoshop.

Our experts

The best artists from around the world reveal specific CG techniques

Houdini

Rainer Duda
rainer-d.de

Rainer has over ten years' CG experience and owns a Side Effects certified training centre for Houdini FX

Maya

Rachel Davidowitz
racheldavidowitz.com

Rachel is a scientific animator and communicator. She learned 3D software at graduate school

Maya, V-Ray

Jochem Aarts
realizm.nl

A freelance 3D artist, Jochem has worked on feature films, TV commercials as well as print media

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**

- Houdini files
- Tutorial screenshots
- Video tutorial

HOUDINI

Build procedural landscapes for UE4

Procedural modelling is a common term in the videogames industry, but so far the discussions on it have covered mostly modular pieces that can be used as a brick system to create landscapes. Houdini FX can provide you with much more power for creating procedural worlds – and being able to create natural proceduralism is like the cherry on top of the cake!

This tutorial focuses on the creation of procedural large-scale landscapes within Side Effects' flagship app, Houdini FX. The procedural large-scale landscape will be used afterwards in a videogame engine and you will be able to control the visual appearance just by simply changing the parameters. The transport of files from Houdini to the game engine – in this case Unreal Engine – is handled by the Houdini Engine plugin and its capability to load Houdini digital assets.

At the beginning of the tutorial you will learn how to start the work process in Houdini FX and what kind of methods you can use to actually deform geometry so that it looks like hills. This means that we need an understanding of basic concepts when working within the procedural graph.

Then we will start working in a new Geometry node with a simple grid that will get refinement attributes. Next we will add more details to the upcoming landscape in three different stages. The area of interest lies in the VOP level, where you have the possibility to call actions on each point. We will look at raw deformations by making use of fractal VOPs. Afterwards we will create more sophisticated deformations followed by adding paths, which can act as streets in the level. The grid will be prepared with proper UV layouts to drive the cellular noise and even a post-processing stage will be covered.

Around the deformation system in the VOP level you will understand how to enhance the visual appearance with more nodes such as the smooth SOP, which flattens the overall shape a bit after adding detail to it. This works like a global smooth brush. In addition we will add normal informations to the asset for a smooth appearance in the engine.

The most important step in this tutorial is the creation of a Houdini digital asset and the creation of a proper UI for it based on the underlying node network, which will be used in Unreal Engine as interface.

> The grid needs a special modifier that will take care of the terrain resolution in Unreal Engine

01 Set up your base At first you must create a new Geometry node within the network editor pane. A Geometry node on SOP level is the manual starting point for most situations. For a clearer way of starting, rename the node to 'Terrain'. Jump inside the Geometry node and replace the automatically generated File Input node with a new Grid node, which will be the upcoming terrain. The second way of creating a grid is by making use of the premade grid shelf tool. Set the size up to 10 x 10 units and leave rows and columns set to 2.

02 Add a resolution modifier The grid needs a special modifier that will take care of the terrain resolution in Unreal Engine. As we are working in Houdini FX within a procedural network, we simply append a new SOP node for that job. Create a new Subdivide SOP node and append it after the Terrain_Base node. This node will now be there to control the polygon density. A start value of 4 or 5 will be good enough; other parameters can stay as their default states.

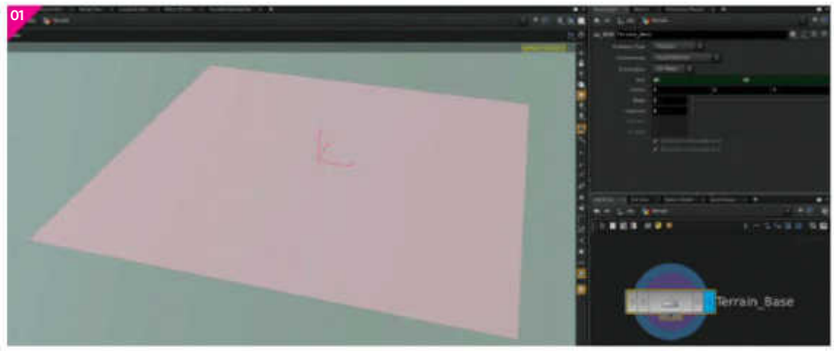
03 Prepare UV coordinates The grid is now in position and has a good polygon resolution. What is missing is a proper UV coordinate layout for the upcoming terrain deformations – this is especially important as we are working with procedural patterns and textures. To add UVs simply add a UV Project SOP node after the Subdivide SOP node. Change the group type to points and hit the corresponding button under the Initialize tab. If you change the viewport from perspective view to UV view you will see the UV layout. The 1 button will let you switch to perspective view and the 5 button will let you set it back to UV view.

04 Play with the terrain deformations The next step covers the creation of a VOP container, which allows for the manipulation of all the points. Just create an Attribute VOP node and append it onto the UV project node. Now dive inside the Attribute VOP node. We need to extract the height axis to assign the fractals correctly. Split the point position up into floats by using a Vector to Float VOP node. Right after that, add a Float to Vector VOP node and connect it to the point position output. Now connect the X and Z floats between the two newly-created nodes.

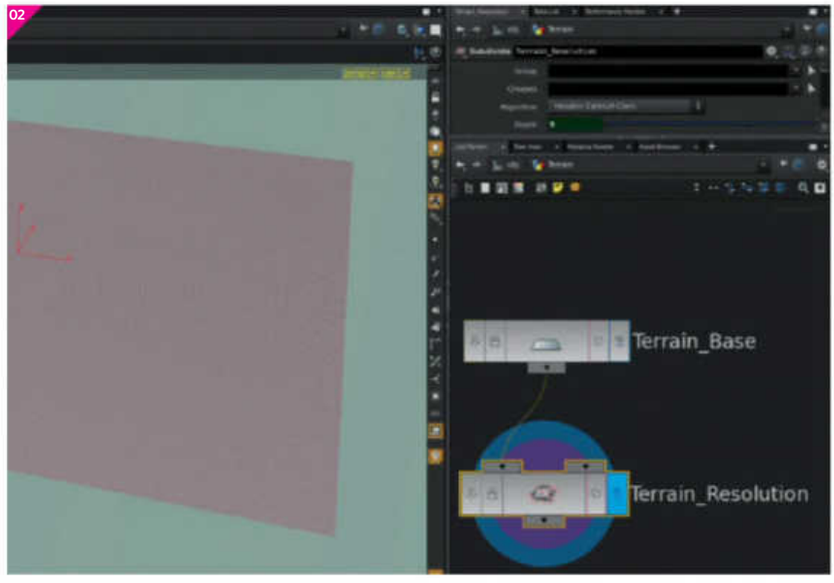
Additional way to deform

In Houdini there are many ways of achieving a specific solution. The way that is described in this tutorial gives you full control of every small aspect which results in more attributes to play with. On the other hand, Houdini has a special SOP node called Mountain. By adding a Mountain node to a Geometry the artist can play with different noise types just by changing the type in the drop-down menu and adjusting the visual appearance by changing the available parameters, which are known from the Noise VOP nodes. There is just one noise type per Mountain node available.

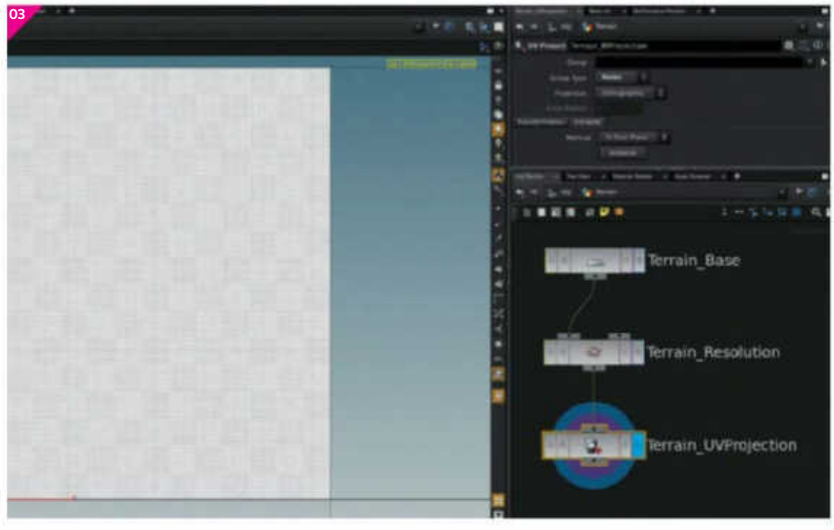
01



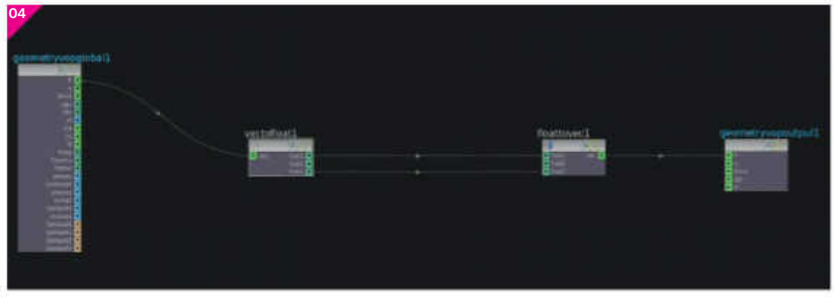
02



03



04



Lock values to avoid overheads

During the creation of a digital asset, especially for videogames – or for real-time engines – it is wise to lock some attributes to a specific range and to not let yourself go over a special multiplier. In this example with the resolution, the polygon density is locked to a predefined range to avoid causing interruptions/ performance lags because the geometry is too finely tessellated. Just use the lock symbol next to the respective attribute to set a lock. It comes also in handy when rotations or translations are going to happen, just to avoid unwanted surprises.

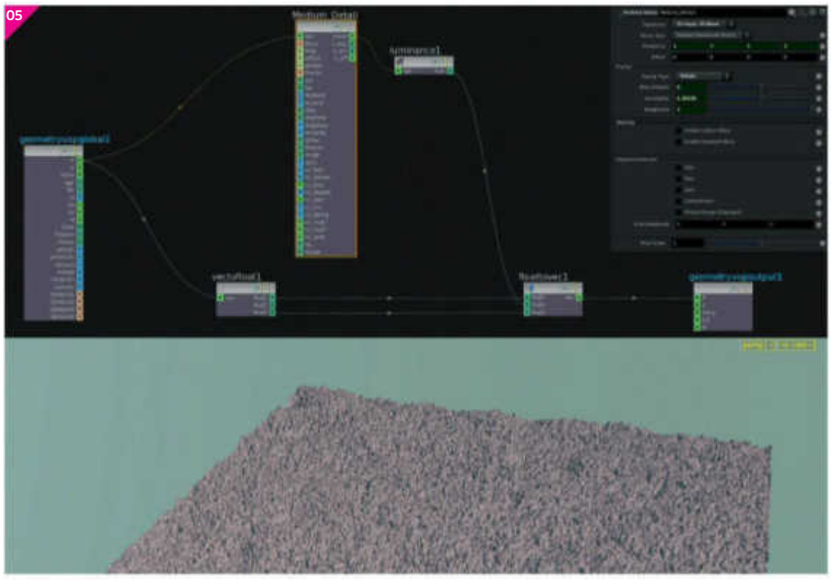
05 Add the first deformation layer Now, as the pipe is free to access the Y attribute of all points, it is time to create a Unified Noise VOP node. Change the Fractal Type to Terrain and set the Lacunarity to 2 with 8 Max Octaves. The many procedural noise nodes need to point to the input assigned to work properly. Connect the P input of the procedural Noise node with the global point positions. This noise has a light green output which indicates vector output but the Y attributes are floats. An easy workaround is a simple Luminance node, which converts the vector to floats.

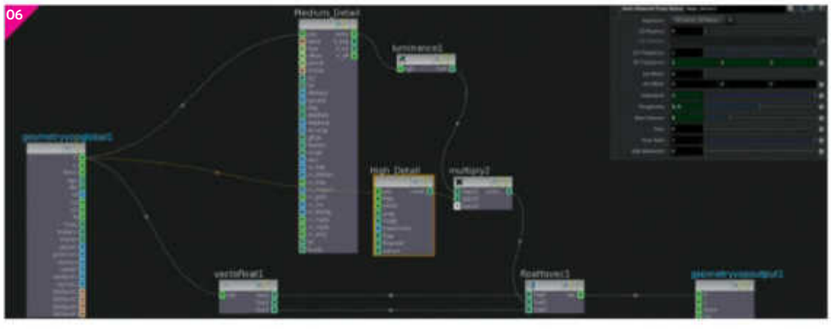
06 Create a natural pattern The terrain has detail but it looks just like a noisy deformation. It is necessary to mix this with another noise method – an Anti Aliased Flow Noise VOP node. Let's create this VOP node, connect the points input with the Global Points attribute and multiply the noise output with the Luminance of the unified noise setup. The result must be plugged in the Y float input of the Float to Vector node to reconstruct a point vector out of the floats.

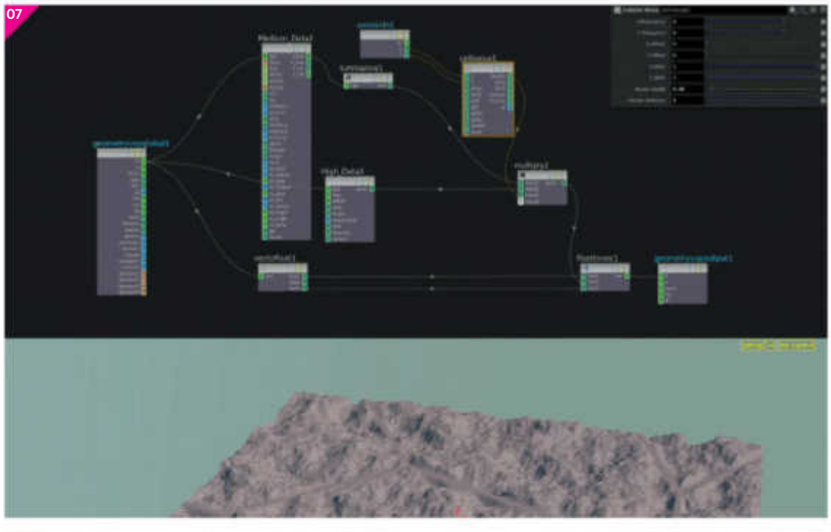
07 Form roads through the terrain Time to add some elements which will enable an easier walkthrough – some roads. The roads and/or paths will be added as well in a procedural method. Let's create a cellular noise, but the node needs information about the UVs and not the point information. Therefore it is necessary to create a UV coords VOP node and connect the S and T fields accordingly. The border output of the cellular noise must be multiplied with the other two noise generators to work properly. Decrease the border width to 0.05 and set a frequency of 2 for S and T. The edge softness is important for making a smooth transition between the roads and rocks.

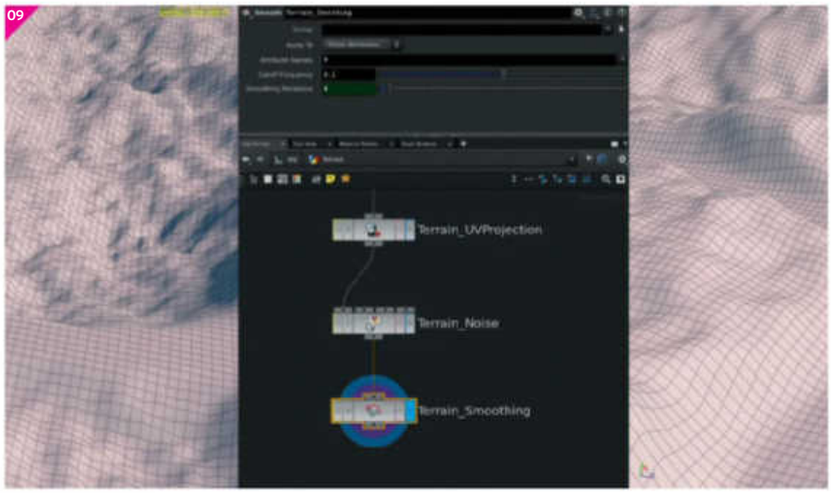
08 Make winding roads for realism The roads or paths follow straight guidelines: they follow the cellular pattern with smoothed edges. It is better for the visual to break straight lines with a separate Anti Aliased Flow Noise VOP node to drive the road deformation. Connect the P input with the Point Globals attribute and convert the vector noise output to a float via a Luminance node. The latter will be the input for the sjitter input at the cellular noise for deforming the roads. Just decrease the roughness to 0.15 and frequency to 0.5.

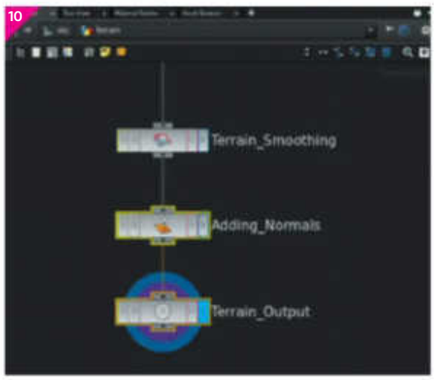
> It is better for the visual to break straight lines with a separate Anti Aliased Flow Noise VOP node



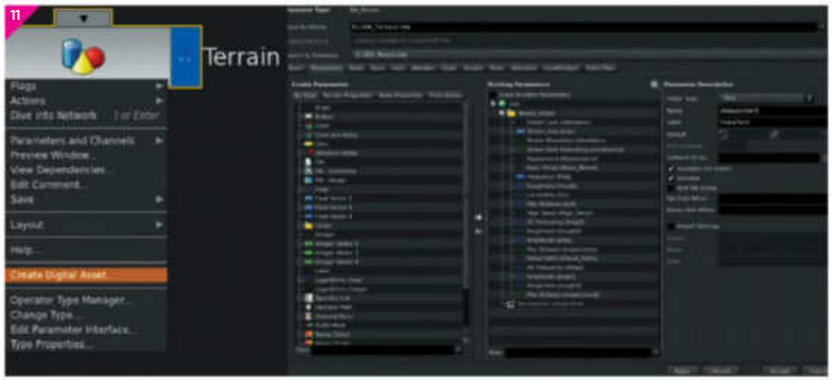


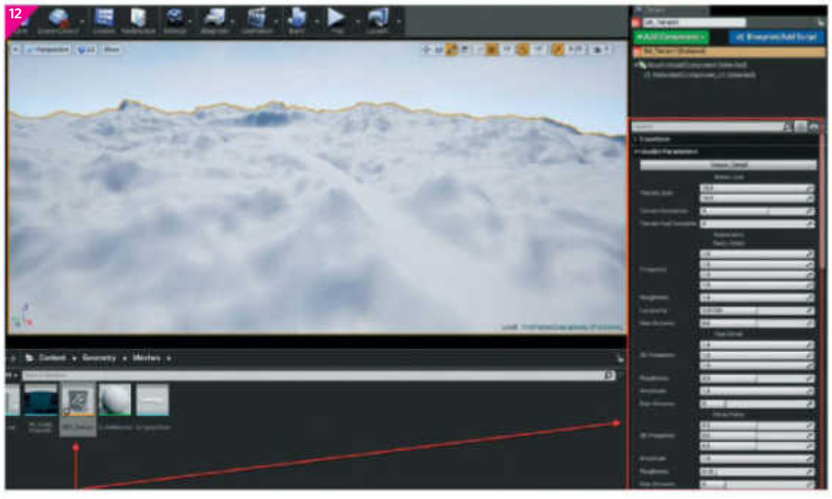






> The faces of the mesh have, in 3ds Max terms, no smoothing groups at all and consist of plain hard edges. To avoid this and inverted normals it is a wise choice to create a Normals SOP node





09 Get a global post smoothing layer As this large-scale landscape is based on a composition of a bunch of fractals and noise nodes, it is recommended to add a post-smoothing option. This stage is just in case the level design later on in the game engine requires more dunes than hills or in case the fractals create some unwanted artefacts, which can cause lighting problems in some circumstances. To create this smoothing layer simply append a Smooth SOP node on the Attribute VOP node. A start value of 4 for the smoothing iterations will be fine as default.

10 Add normals to the landscape Often, when geometry – especially procedurally generated geometry – enters a videogame engine the faces of the mesh have, in 3ds Max terms, no smoothing groups at all and consist of plain hard edges. To avoid this and inverted normals it is a wise choice to create a Normals SOP node and connect it after the Smooth SOP node. The Normals SOP node will take care of the object normals. In terms of creating them, point them to the right destination via changing the Cusp Angle. By default the node picks the right data from the nodes above and only the Cusp Angle must be touched.

11 Create a Houdini digital asset By now the landscape is finished and it is time to create a digital asset out of it. A digital asset is easily explained as nothing more than an encapsulated network within a special HDA file. This HDA file can be imported in any application that supports the Houdini Engine with a plugin. Simply right-click on the Geometry node which holds the network and then press 'Create digital asset'. In the newly opened window, add only the parameter that needs to be worked on by the videogames artist later on, hit the Apply button and finally, click on Accept.

12 Move the landscape into a real-time engine Now it is time to bring the landscape over into the videogame engine. In this case we will be bringing it into Unreal Engine 4.11. Just make sure that you have a proper installation of Houdini as well as the Houdini Engine plugin for Unreal Engine. During the Houdini installation, a window will ask you what kind of Houdini Engine plugins should be installed. In the Unreal Editor you will simply need to target the desired folder and then hit the Import button. Just select the HDA file called Terrain.hda and Unreal will then import the landscape. In the attribute editor that is within Unreal Engine, all of the parameters that are available on the asset will be displayed and they can be changed to suit your needs.

Sophisticated asset preparation

If you're creating assets like interiors, there are more attributes and special data that needs to be transferred. Therefore, Houdini FX can be used to transport even more data to the game engines like a multi-materials setup where an asset can contain more slots for materials. Just group points via the group node and assign dedicated materials or simple collision geometry and collision in the engine later on. A poly reduce node can be applied in a second branch to create, low-poly fallback collision geometry. Alternatively, poly can be converted to VDBs, reduced and converted to back geometry.

MAYA

Enhance liquid and foam simulations with Bifröst

Bifröst is Maya's procedural framework that creates liquid simulations using a fluid implicit particle solver. Bifröst liquid simulations are incredibly simple to set up, and enable the user to quickly add realistic liquid effects, such as pours and splashes, to a scene. To create a liquid splash effect, all you need to do is create the Bifröst liquid and a container to hold the liquid. Then add objects to collide and interact with the liquid to create realistic splash effects. But sometimes a physically accurate splash is just not dramatic enough for your scene. We can use a Bifröst accelerator to enhance the splash effect that will enable us to create a more dramatic scene.

In this tutorial, we'll show you how to create a liquid splash simulation using Bifröst, how to enhance the splash effect using accelerators as we've previously mentioned and, finally, how to add more realistic detail to the simulation by adding foam particles. We'll show you how to set up the scene, add an accelerator and adjust its settings to generate the effect we want. First, we'll create and animate the objects in our scene. We'll add a Bifröst liquid to the scene and add the dolphin and liquid containers as colliders. We'll take a second copy of the dolphin mesh and add it as an accelerator. We'll tweak the accelerator settings and keyframe them at the appropriate times to force our Bifröst liquid up, creating a dramatic splash. Finally, the Bifröst liquid can be meshed, and lights and shaders can be added to finish the scene.

A newly added feature to Bifröst in Maya 2016 enables you to add foam particles to your liquid simulation. Fast moving parts of the liquid simulation will emit additional foam particles to mimic bubble and froth effects, which adds an additional layer of realism to splash effects. After the creation of the Bifröst liquid itself, foam can quickly be added to the simulation by simply selecting the Bifröst node in the outliner and choosing Foam in the Bifröst menu.

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**
- Tutorial screenshots
- Video playblast

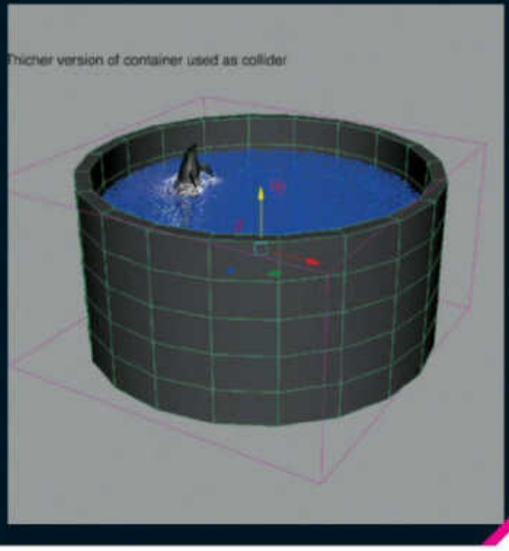
01 Set up the scene The first thing you'll want to do is create and animate all of the objects in your scene. Keep in mind that Bifröst will treat all of your objects in a scene as if they were modelled in metres, regardless of what unit is set in Maya's preferences. A one-unit cube in Maya is therefore considered a one-metre cube by Bifröst. We've modelled and animated a dolphin (which is about 2.5 metres long) jumping out of, and back into, a body of water. We've then created a small container to hold the water for the purpose of this tutorial to keep our calculation times low, but Bifröst can easily handle much larger bodies of water if you want to create them. We've also created a cylinder slightly smaller than the container that will serve as our Bifröst liquid emitter.

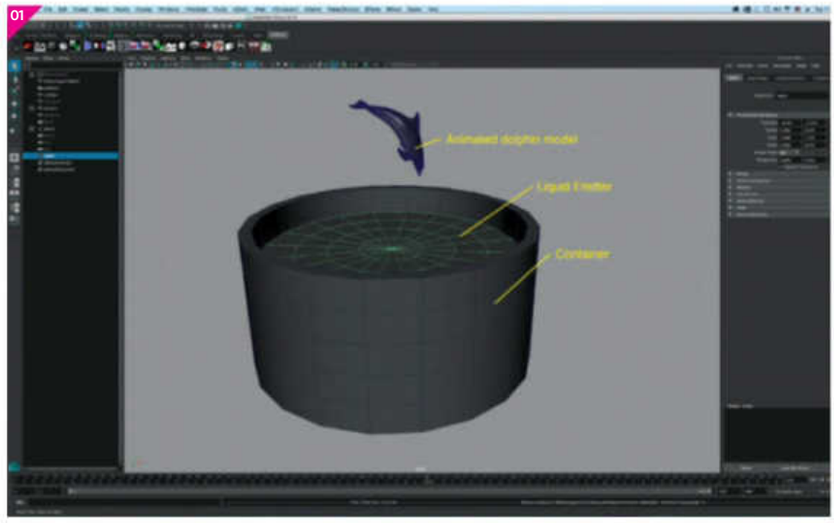
02 Duplicate animated dolphin mesh We will need a second copy of the dolphin for a later step, so we will duplicate the animated mesh at this stage. With the dolphin mesh selected, under the Edit menu we'll select Duplicate Special options. Now just simply turn Duplicate Input Connections on and click Duplicate Special in order to create another dolphin mesh.

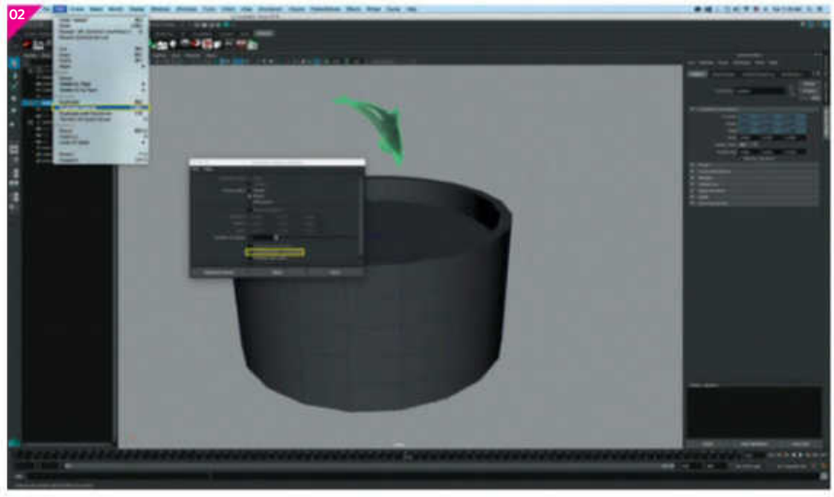
03 Add Bifröst liquid Let's create the Bifröst liquid. First, select the cylinder inside the container and then under the Bifröst menu (found in the FX menu set in Maya 2016) choose the Create Liquid option. This will create three Bifröst nodes: Bifröst1, BifröstLiquid1 and BifröstMesh1. You may need to rewind the simulation to see the blue dots, which represent the Bifröst particles, show up in the viewport. You can then click on the original polygon water object in the outliner and press Cmd/Ctrl+H on the keyboard to hide the mesh from view.

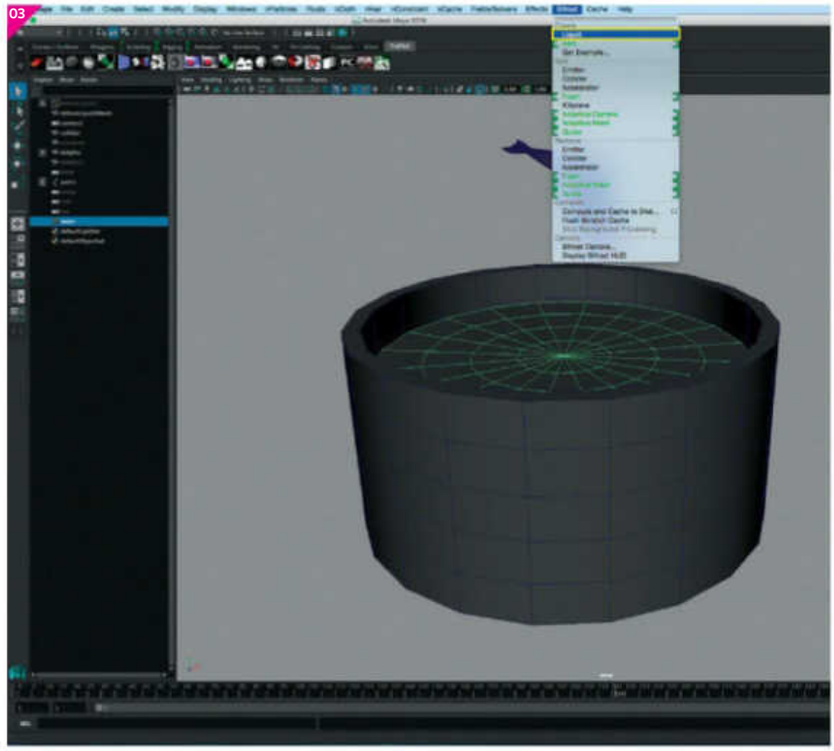
Tip for creating colliders

Are you having trouble with Bifröst particles leaking outside of your containers? Bifröst works best when the collision objects are modelled thick. If you want a thin container to appear at render time, you may want to model both a thick and thin version of the container. The thicker version can be used as the collider in the Bifröst simulation, which is hidden at render time, while the thinner version of the container is rendered.









> As the Bifröst simulation is calculated, the frames turn green to indicate that the simulation calculated successfully

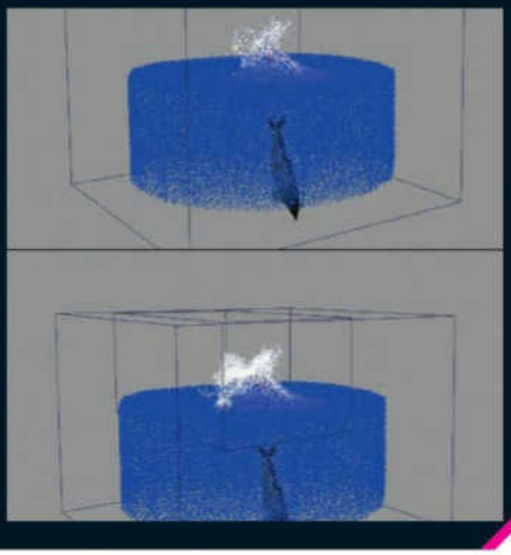
04 Add container and dolphin meshes as colliders If you rewind and play the simulation now, you'll notice that the water falls right down through the container. Let's make the container a collider by selecting the container in the outliner, Shift+selecting the Bifröst1 node, and under the Bifröst menu select Add Collider. Now if you rewind and play the simulation the water will remain in the container. Let's also add the dolphin model as a collider. Choose the original dolphin mesh in the outliner, Shift+click the Bifröst1 node and under the Bifröst menu choose Add Collider.

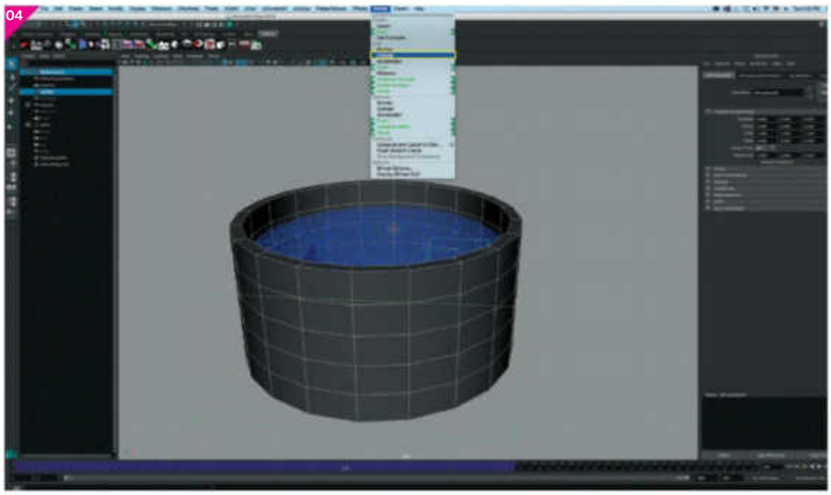
05 Add a kill plane You may also want to add a kill plane, which will eliminate any particles that escape from the bounds of your simulation. With Bifröst1 selected, under the Bifröst menu choose Add Kill Plane and adjust the position of the plane so it sits just below the floor of our scene.

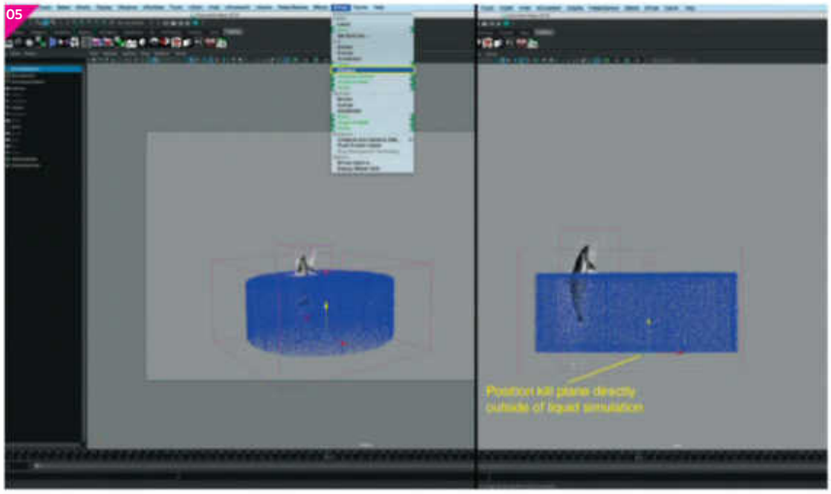
06 Adjust Master Voxel Size Preview the simulation as it is now. Rewind and click the play button on the timeline and play through the animation. You'll notice that the timeline turns yellow as the time indicator passes. As the Bifröst simulation is calculated, the frames turn green to indicate that the simulation calculated successfully. The Master Voxel Size sets the scale and detail of our simulation. The

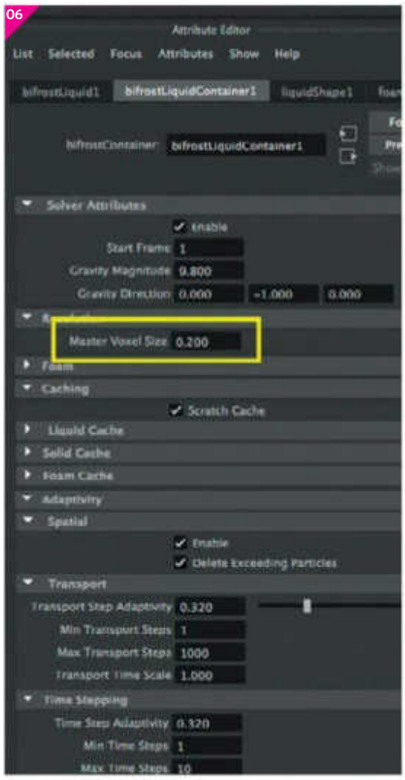
Add foam spray to Bifröst simulation

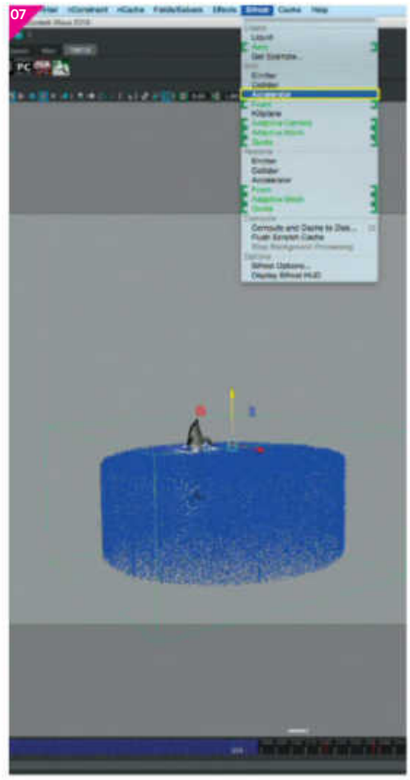
In Maya 2016, you can add foam particles to a liquid simulation to create effects that include bubbles, foam and spray. Let's find out how to add a foam effect to our splash simulation. First, select the BifröstLiquid1 node and under the Bifröst menu choose the Foam option. Rewind and then play the scene to view the foam. You can then go and edit the foam settings under bifrostLiquidContainer1>Foam. The accompanying image below shows a comparison of the liquid simulation without and with foam particles.

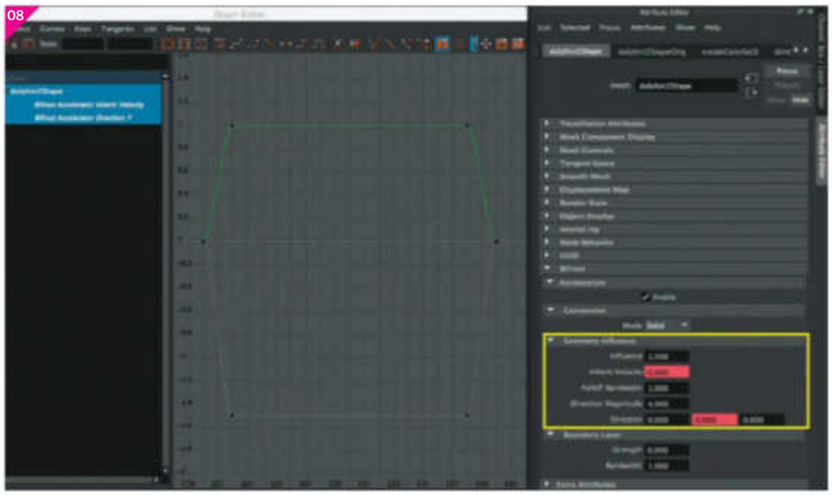


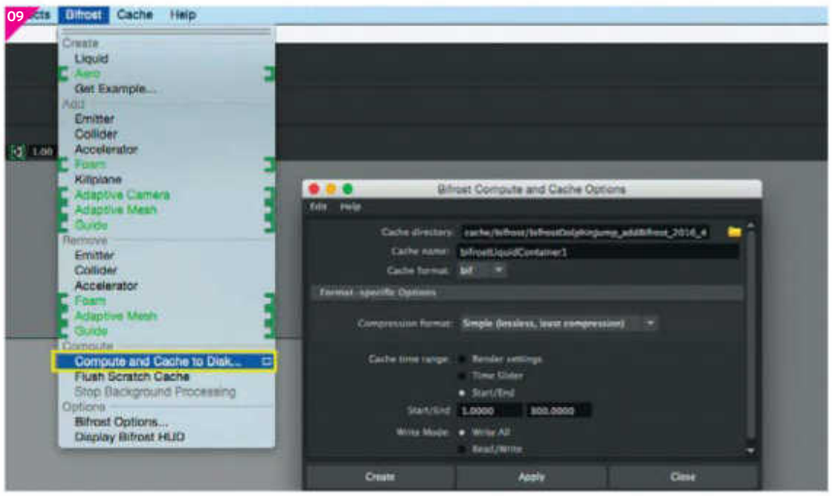


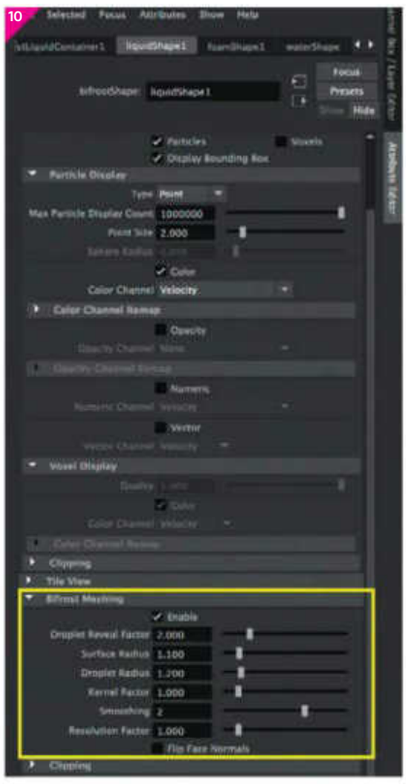


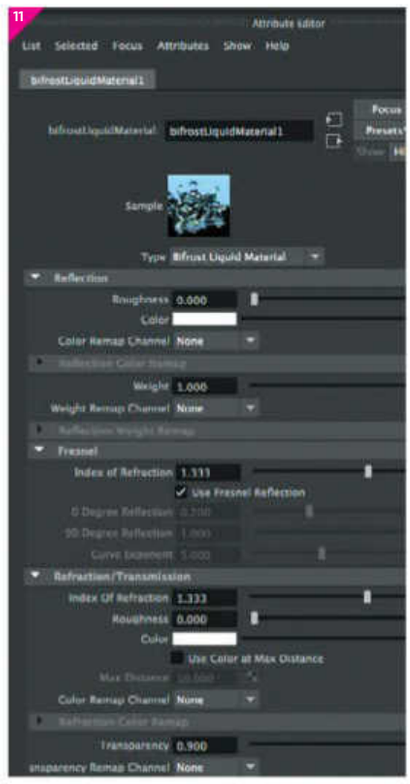












default is a little large for our size scene, so let's increase the resolution. With Bifröst1 selected, find the Master Voxel Size under the bifrostLiquidContainer1 tab and change it to 0.2. Rewind and play the simulation through and enable the Bifröst simulation to finish calculating. You'll notice that there's a nice water trail when the dolphin exits the water, but when the dolphin jumps into the water again, the splash isn't very impressive. Let's create a larger splash using an accelerator.

07 Add an accelerator to the simulation Select the second copy of the dolphin mesh in the outliner, Shift+click Bifröst1, and under the Bifröst menu choose Add Accelerator. If you rewind and play the simulation now, the accelerator will be active during the entire simulation, which is not what we want. In the next step though, we'll describe how to adjust the accelerator to only affect the Bifröst liquid during the entry splash.

08 Adjust accelerator setting to enhance splash Under the dolphin2Shape tab, twirl down the Acceleration tab and change the Influence to 1.5 and the Directional Magnitude to 4. Choose a time that is a few frames before the dolphin re-enters the water (220) and keyframe Inherit Velocity to 0 and Direction Y to 0. Now move a few frames ahead (222) and keyframe Inherit Velocity to -1.5 and Direction Y to 1. Now as the dolphin enters the water, the accelerator will influence the particles to move up and away from the dolphin. Keyframe Inherit Velocity and Direction Y back to 0 when the dolphin is back in the water (approximately 240). Rewind and play the simulation again. Now we have a much more impressive entry splash.

09 Create Bifröst liquid cache Once you're happy with the simulation, you can cache the data. Select the Bifröst1 node. Under the Bifröst menu, select Compute and Cache to Disk>Options. You can choose a directory name, a cache time range and click Create to generate the cache.

10 Enable the Bifröst mesh Let's turn on the Bifröst mesh. Select Bifröst1 and under the BifröstShape1 node, twirl down the Bifröst Meshing tab and click Enable to turn it on. Change the Droplet Reveal Factor to 2, the surface radius to 1.1 and the Kernel Factor to 1 to create a more detailed mesh. Before rendering, hide the Bifröst1 node (so it doesn't render in addition to the mesh) by selecting it in the outliner and clicking Cmd/Ctrl+H on the keyboard. You can then cache the Bifröst mesh itself by selecting the BifröstMesh1 node and then under the Pipeline Cache menu choose Alembic Cache>Export Selection to Alembic.

11 Edit colour A Bifröst liquid shader will be applied to the Bifröst mesh by default. It does a pretty good job out of the box, but the colour and other properties can be edited under the BifröstLiquidMaterial1 tab. Add custom materials to the dolphin and other objects, add a simple Physical Sun and Sky to quickly light the scene and render the final sequence using mental ray.

> "As the dolphin enters the water, the accelerator will influence the particles to move up and away from the dolphin"

MAYA

Block out 2D CAD forms for arch vis in Maya

Since showrooms are limited in space and there may be many ideas to show, the spaces can get crowded very quickly. A solution is to turn those ideas into nice visuals you can print or show on big screens in the showroom. Eventually these visuals can be used for advertising purposes in real estate magazines. This photoreal render was created for a client that designs high-end kitchens and bathrooms,

Most people, when arch vis is needed, think of the much-used combination of 3ds Max and V-Ray. Well, this tutorial takes a little different approach. V-Ray is still used as a renderer for this project, and for arch vis this is one of the greatest renderers available. It's robust enough to handle large and heavy scenes, and it has a rich library of lights, shaders and other tools that make your job a little bit easier.

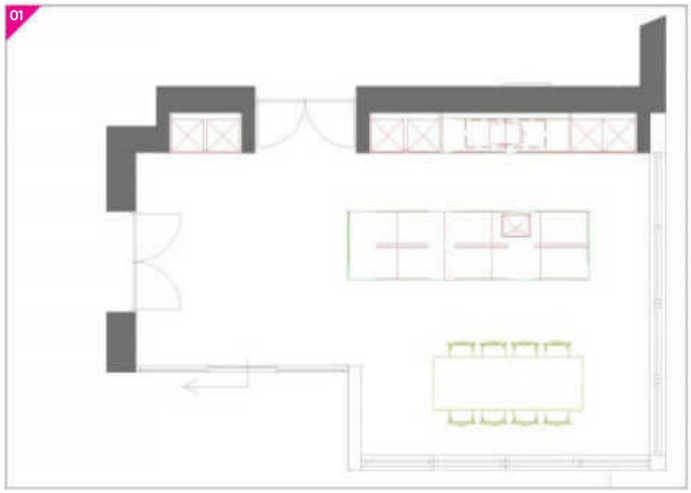
The difference in approach is in the main 3D software package. Instead of 3ds Max we will be using Maya. There aren't as many examples of arch vis in Maya. Many forums are filled with 3ds Max users, and they can't help you out or they will tell you it's not possible – but it is. Surprisingly a lot of things will take the same approach, but they may be called different things or may need different buttons to be clicked.

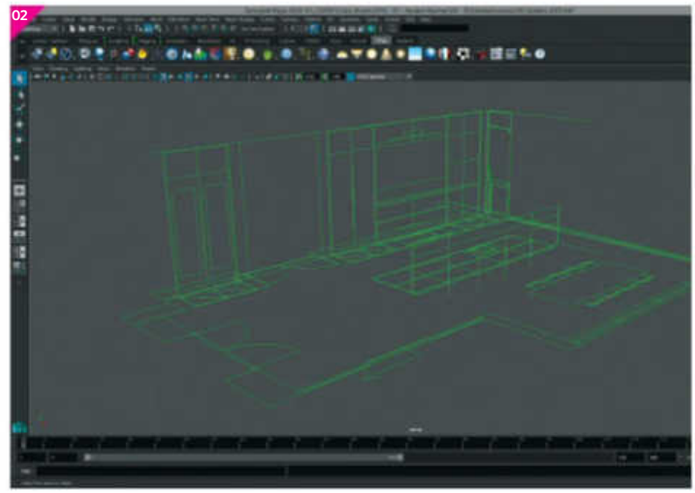
When all was finished the result was four great visuals. A great visual is made between the keyboard and the chair. The artist makes the visuals and the software is just a tool. All software packages have their pros and cons, but in the end it's the final result that counts.

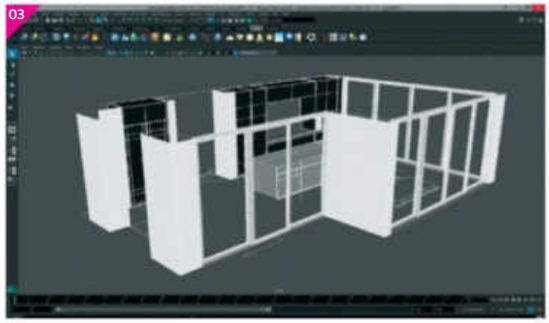
01 Make a list The initial brief we got had a 2D CAD file, with some dimensions on it and photographs of some materials that should be used in the kitchen, but it was not complete. So start making a list with all the items on it and give them all a description like the material, colour codes and so on. Along the way more items will be added, but it's good to know what you need now so you don't have to call the client every day and ask them again about colours and materials.

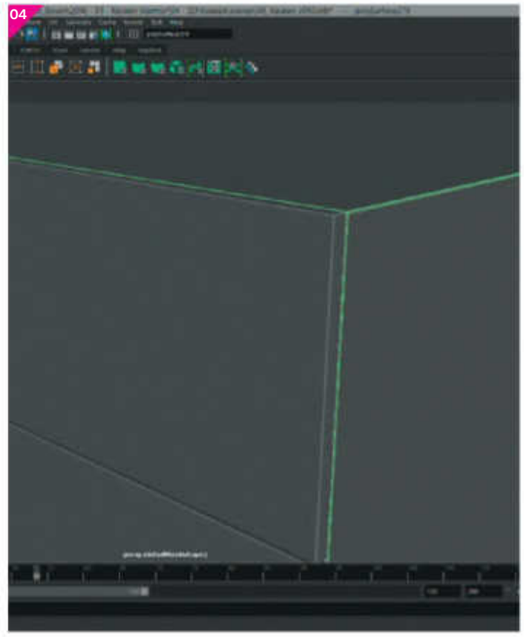
02 Turn 2D to 3D In Maya import the CAD file and make some kind of 3D layout from this flat 2D image to get a relatively clear view about the dimensions of the scene. Make sure you work in a real-world scale, as it makes the modelling and lighting process much easier and more precise. A lot of items are not available as a 3D model, and you may have

YOUR FREE DOWNLOADS
from **filesilo.co.uk/3dartist**
• Tutorial screenshots









to build them by yourself. Then, using the measurements, make sure that everything matches.

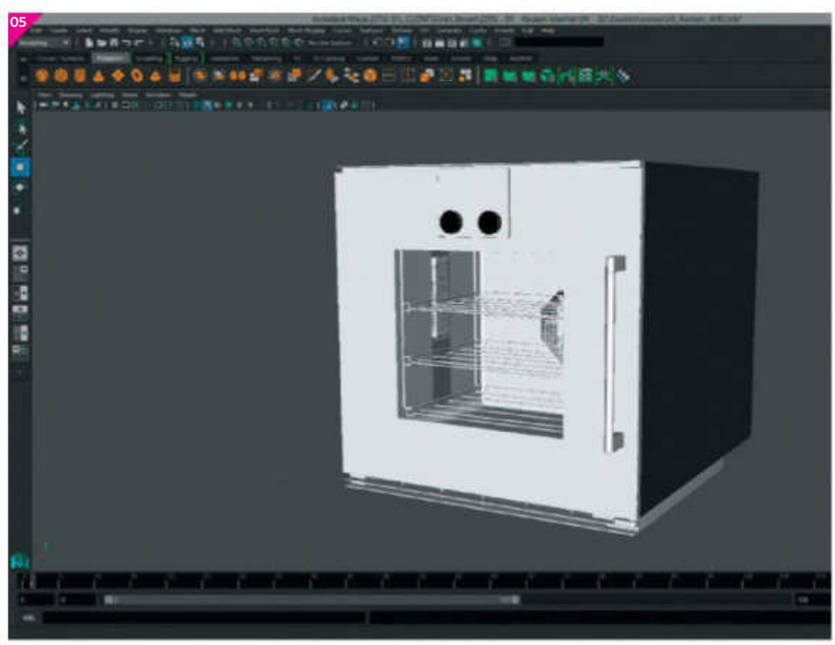
03 Block the scene After the layout is done, start blocking out the scene. Just place blocks where the fridge, counter and kitchen cabinets will go without any details and kitchen appliances yet. Give them a plain colour that is roughly the same colour as the texture it will get eventually. The height, width and depth of the objects were also written in the CAD file so we could use these numbers and place everything in the scene. If you enable backface culling in your viewport you can place the roof, and you will also be able to look through it.

04 Add edges and ridges Make sure you add small bevels/ridges to the edges, as this way they catch some light. Some render engines have a rounded edge option available so you don't have to bevel the meshes, but the edge will get rounded off during rendering time and will also give you less control. Real hard edges almost don't exist in the real world and it would look 'too CG' if they were done in that way. If you like, you can sculpt small dents and scratches to add more realism, but only start that process after all the models are done.

05 Model the props Almost none of the items placed in the scene were available as a 3D model, but luckily there is a lot of information available on the internet. If you go to the website of one of the products you need to build, you can find detailed descriptions, drawings and photos of that item. Here you can find the right dimensions, colour codes and materials to use, too. So if you go through the spec sheet you can find most of the info you need for modelling. These sheets contain the real-world scale measurements, which is why it's important that your whole scene is in the right scale.

Arch vis in Maya?

A lot of arch vis is done in 3ds Max, and it almost looks like it's not possible to do with other 3D packages, but that's not true. Sure 3ds Max has some nifty plugins that are very handy for making these types of visuals, on the other hand, it can force Maya users to think about processes instead of clicking plugin buttons that generate stuff. Not that this is wrong, but it's a different approach. In the end it's the artist that creates those images, and the software that is used is just a tool.



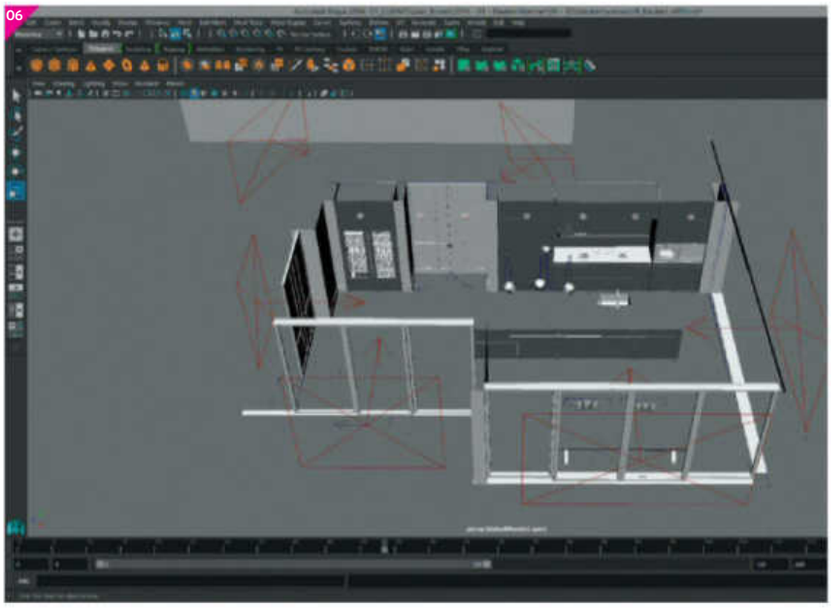
06 Light the scene When all of the items are modelled it's time to start to add some light to the scene. As the main light we used a VRay Dome Light with an HDRI texture. Some portal lights are placed behind the windows and some extra lights are placed in the back, to provide some light from the other room behind the door. The lights in the back had a warmer temperature, so you create a contrast with the colder light coming from the outside.

07 Balance the light IES lights were added and we used a material override with a default V-Ray material to do some test renders to see how the lighting works. This way you have fast results and it's easy to see if the lights are correct or not. Try to get some interesting shadows by rotating your main light, setting different exposure values and playing with some different HDRIs. Placing a chrome ball in your scene can help you see where the light is coming from.

08 Texture and shade When the lighting is done, it's time to start texturing and shading. Creating the right shaders and textures helps to sell the image. Start with a simple setup for each shader. Take a close look at real-life examples as we found that if you add a small amount of sub surface scattering (SSS) to the marble shader, it looks way more realistic. If you take a close look at marble, you can see that light penetrates the stone. It's very subtle, but it's there. So try to mimic that in the shader.

09 Place the camera and render We chose to place four cameras, but try to find interesting spots that shows the viewer an interesting image. The camera settings are pretty straightforward: we used a focal length of 28mm and made it a VRayPhysica Camera – this way you will have more control over your light and image. Tweak the white balance a bit to reduce the blue tint of the HDRI. Set your resolution (we used 4K for this) and select your passes, eg Z-Depth, specular, refraction, ambient occlusion, lights and ObjectID for extra control in Photoshop.

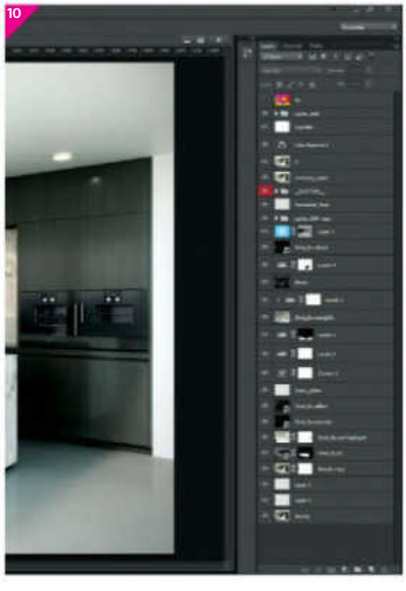
10 Tweak the scene The finishing touch was done in Photoshop after the rendering was complete. Import the layers and do some minor tweaks, which mainly consists of adjusting curves on different parts of the image, and adding more reflections, refractions and lights. To make it softer, add some bloom and a small chromatic aberration – the keyword is 'small'. Often you see images where this has been overdone, and it instantly looks fake and over the top. When satisfied with the end result we gave the other shots the same treatment and ended up with four beautiful shots of a unique kitchen.


06

07

08

09


10

Special offer for readers in **North America**

5 issues FREE

When you subscribe*

FREE resource downloads every issue

"Practical inspiration for 3D enthusiasts and professionals"

Order hotline **+44 (0) 1795 592 951**

Online at **www.imaginesubs.co.uk/3da**

Quote **USA2** for this exclusive offer!

***Terms and conditions** This is a US subscription offer. You will actually be charged £80 sterling for an annual subscription. This is equivalent to $120 at the time of writing, exchange rate may vary. 5 free issues refers to the USA newsstand price of $14.99 for 13 issues being $194.87, compared with $120 for a subscription. Your subscription starts from the next available issue and will run for 13 issues. This offer expires 30 September 2016.

Technique focus

Incredible 3D artists take us behind their artwork

LIGHTING I exported the circuit patterns to Illustrator to get a more consistent circuit board look to mix with the circular tapestry-inspired elements. The eye was modelled in MODO with a basic tubular tool, so I could match the background film footage light and also have the spotlight on the 3D device to affect the eye tube's luminosity from the inside.

Davison Carvalho
hellodave.co

A lead interface/concept artist, Davison has worked on films like *Captain America: Civil War*

Software Illustrator, PCB Creator, MODO, After Effects, Photoshop

Seer, 2016

Lenovo ThinkPad P40 Yoga

Sculpt and model using touch controls with Lenovo's convertible ThinkPad Yoga tablet

There are a number of options for modellers who want to try 3D design on a tablet: one is the 12.9-inch Apple iPad Pro and the accompanying Pencil stylus. But while you can export models from iOS and Android into a format that works just fine on the PC, it might make sense to have the tablet running Windows directly, so you can use the very same tools and environment as your main 3D system.

Microsoft's Surface line might be a better choice then, as they can run the same x86 software you have on the desktop. But Surface is a general-purpose tablet, and hasn't been designed with 3D applications specifically in mind.

This is where Lenovo's ThinkPad P40 Yoga comes in. It's a hybrid tablet, so it can be used as both a (thin, Ultrabook-style) laptop and in tablet mode, with the screen flipping around to the back and held like a slate. But the really unique aspect of the P40 lies with the internals. It's the only tablet we've seen that has a discrete professional-grade graphics card, in the form of an Nvidia Quadro M500M with 2GB of dedicated memory, rather than the integrated graphics relied on by so many other tablets.

With a mobile Quadro, you're getting ISV-certified drivers, guaranteed compatibility with 3D software and strong support for both OpenCL and CUDA acceleration – important for any modern design software.

It can be configured with 16GB of memory, and in this more high-end model on test is a dual-core Intel Core i7-6600U processor with a top Turbo speed of 3.4GHz. The 14.1-inch 1080p IPS screen responds to presses of a finger as well as it does those of the ThinkPad Pen Pro stylus, which pops out from a compartment at the bottom.

There are two variants sold on Lenovo's site, starting at £1,259 for a 3.1GHz Core i7 6500U chip and 256GB M.2 SSD. This version has a 512GB SSD, and costs £1,579, a price that puts it in direct competition with high-end laptops.

As expected from Lenovo, the build quality and design of the P40 are of a superbly high standard, with a strong, rigid carbon-fibre body, solid metal hinge, designed to support constantly flipping the screen around and the trademark dark grey ThinkPad colours.

Using the pen, drawing is comfortable, and it is possible to interact with fully mouse-driven desktop software like Maya with just the stylus alone. But it's also straightforward to snap back to laptop mode, plug in a mouse and use the P40 like a normal computer.

But the benchmark results are a reminder that performance is always a slight trade-off with thin, portable computers. With a dual-core, low TDP processor, the P40 cannot offer the same horsepower to chomp through polygons that larger workstations can. Cinebench muddled along with a score of 325, the 3ds Max Underwater 1080p render took over an hour and regardless of its certified drivers, the M500M can't really do a huge amount, evidenced by its comparatively low SPECviewperf scores.

Although these results are hardly surprising, it's understandable in a laptop designed to be this thin. But it leaves us not entirely convinced by the concept of the Lenovo ThinkPad P40 Yoga.

With a 14-inch screen, it's not portable enough to carry in hand luggage, nor is it especially powerful. Touch-friendly 3D modelling tools still give reasonable results on smaller tablets that cost less than half as much. With its dual-core processor, in CPU tests the P40 lags behind dedicated, larger mobile 3D workstations with quad-core processors from a similar price bracket.

But the P40 Yoga isn't trying to top the performance charts. It aims to bring full 3D design software to a touch-sensitive device, and does so very well. We wouldn't want it as our only workstation though.

Orestis Bastounis

MAIN With a strong body and rigid chassis, the design and build quality of the Lenovo ThinkPad P40 Yoga are faultless

BOTTOM LEFT The hinges support 180-degree rotation of the screen, laying it flat or upright

BOTTOM MIDDLE The keys provide excellent travel and accompanies Lenovo's UltraNav pointing device

BOTTOM RIGHT The carbon fibre and magnesium alloy frame means that the P40 has been created with durability in mind

BELOW The stylus hides away in a small compartment underneath the laptop

> As expected from Lenovo, the build quality and design of the P40 are of a superbly high standard

Essential info

Price	£1,579
Website	lenovo.com
CPU	Intel Core i7 6600U
RAM	8GB DDR3L 1600MHz
SSD	512GB M.2 SATA 6GB/sec
HDD	Seagate 1TB 7200RPM
Display	14.1-inch IPS touch-sensitive

Summary

★★★★★ **Features**
★★★☆☆ **Performance**
★★★★☆ **Design**
★★★☆☆ **Value for money**

Verdict ★★★½☆

The Lenovo P40 is a superbly built hybrid, but its size and middling performance are reasons for caution

Golaem 5

New crowd-control tools adorn Golaem's latest release to alleviate the mammoth task of directing throngs

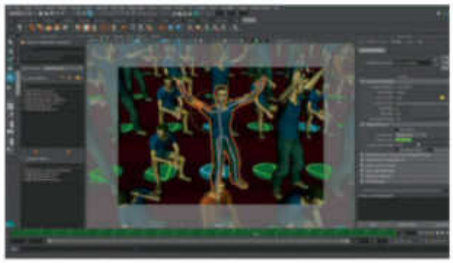
Need to populate a concert hall with lighter-waving fans, re-create a historical battle with thousands of trained soldiers or take the USS Enterprise into uncharted territory inhabited by an endless supply of Tribbles? Then you'll likely need a crowd-generation tool such as Golaem. Already industry-proven with productions like *Game Of Thrones* under its belt, we put its new features to the test.

First up is the new simulation Cache Layout Tool that lets you customise simulated characters. Previously, options for working with simulated characters were limited, making retakes for even minor fixes a lengthy process of reiteration and then re-simulating. Simulation Cache Layout deals with this by letting you layer operations (such as moving, scaling, duplicating and deleting characters), alter behaviours in the Behaviour Editor or clothing in the Character Palette on top of the simulation, and then saving the changes. This is a solid step forward by granting more options to artists without having to go back to step one. Postures can also be edited by selecting the asset in Component Mode, hitting F10 and offsetting their joints, which is also kept in a layer operation.

However, while you can select several characters and alter their poses individually, there's no option to apply a layer with a posture change to a different character so making a bunch of changes to characters is very much a manual process. Also, we encountered a lot of crashes using the tool, which reduces the time-saving benefits. The Cache Layout tool works non-destructively so you can toggle on and off layered changes. It also harnesses the GPU for speed. The Layout Tool is available as a standalone product, which acts as a less expensive method of editing simulation data.

The new Trigger system moves triggers from the Attribute Editor to the Behaviour Editor, and includes a Trigger Library with new features such as fading in and changes to Operators. Sequencing triggers is now easier since becoming nodal; its drag-and-drop formula makes setup a breeze. It's also friendly to learn by emulating the existing Behaviour system. Other new features include a nodal Asset Manager for importing characters with one click and creating relations with other assets, and blind data which lets you store your data in Golaem characters. It's worth grabbing the free 5.1 update for bug fixes and some minor edits including grouping layers in the Simulation Layout Tool.

Paul Champion



TOP You can re-create the sporting phenomenon of the Mexican wave using Golaem

BOTTOM Make changes post-simulation such as changing clothes to avoid obvious 'twins', reposing characters to remove intersection problems or quickly fine-tuning positions

Essential info

Price	€650 / $850 per month
Website	golaem.com
OS	Windows XP SP3 and up 64-bit only / Red Hat 6 WS / CentOS 6, Fedora 14 and OpenSUSE 12, 64-bit
Graphics	OpenGL 3.3 (2010)
GPU	Nvidia GTX 770 / AMD Radeon R9 280X minimum
Maya	Version 2014 and up 64-bit
RAM	4GB (for Maya)

Summary

Features
Performance
Design
Value for money

Verdict

There's plenty of scope for further development of the new tools and features added to Golaem 5

CREATE THE IMPOSSIBLE

www.photoshopcreative.co.uk

EVERY ISSUE • DOWNLOAD FREE RESOURCES

Photoshop creative

Available from all good newsagents and supermarkets

ON SALE NOW

• Striking imagery • Step-by-step guides • Essential tutorials

BUY YOUR ISSUE TODAY

Print edition available at www.imagineshop.co.uk

Digital edition available at www.greatdigitalmags.com

Available on the following platforms

Print Tablet Phone Desktop

facebook.com/PhotoshopCreative twitter.com/PshopCreative

3ds Max 2017

Last year saw the "biggest Max ever" released with the Max Creation Graph. What can we expect this year?

Once again, Autodesk has launched a new version of 3ds Max with some new features, but mostly the focus is on speeding up and simplifying old tools. The update is obvious from the first launch with a minimalistic user interface and more modern icons, text format and menus. Autodesk has gotten rid of the old-fashioned look from previous versions.

From a modelling perspective, the package updates the Booleans system, Operhands (meshes used to Boolean other geometry) are now slightly more precise and it is easier to add and delete them. UV mapping has also been enhanced performance wise, making UV navigation and addition much faster than before. Some UV tools have been simplified in order to get more predictable and easier operations, cutting times throughout the whole process. The Object tool has also been improved, helping you with repetitive actions without the need of going to menus constantly – one of 3ds Max's weakest points until now. Point to point selections are now a reality when holding Shift, including a prediction of where the selections will go even before clicking. Sub-objects are now accessible and selectable using new hotkeys. Also the Local Align adds a new axis for predictable transform results. Version 2017 also includes a new 2D decal tool based on texts or animated objects – it is fully interactive and removes the annoying baking step.

In terms of rendering, Autodesk has included the new Raytracer Renderer (ART), a physically based renderer that is specially indicated for industrial and architectural visualisation. It supports IES and photometric lights from Revit.

From an animation point of view, productivity has been enhanced with some improvements, the trackview has a completely new layout and new tools to manipulate key values and times, making it easier to select and frame keys in the editor. The motion panel now has copy/paste/reset capabilities and faster selection of tracks in list controllers. Geodesic Voxel and Heatmap Skinning are two new additions to help refine weighting in specific areas more easily.

Game devs will love some of the newest additions, especially a model exporter with presets for pretty much every commercial game engine, such as Unreal Engine 4, Unity or Stingray. There is no longer any need for checking engine specifics and trying to figure out what was wrong with your export. Stingray (a real-time engine for games by Autodesk) integration has also been improved. Shader visual quality has been upgraded in the 3ds Max viewport. There is also a better connection between software with Live Link, a quick way to send and update actors from Max to the engine. Creative Market, the 3D content shop by Autodesk has been integrated directly too.

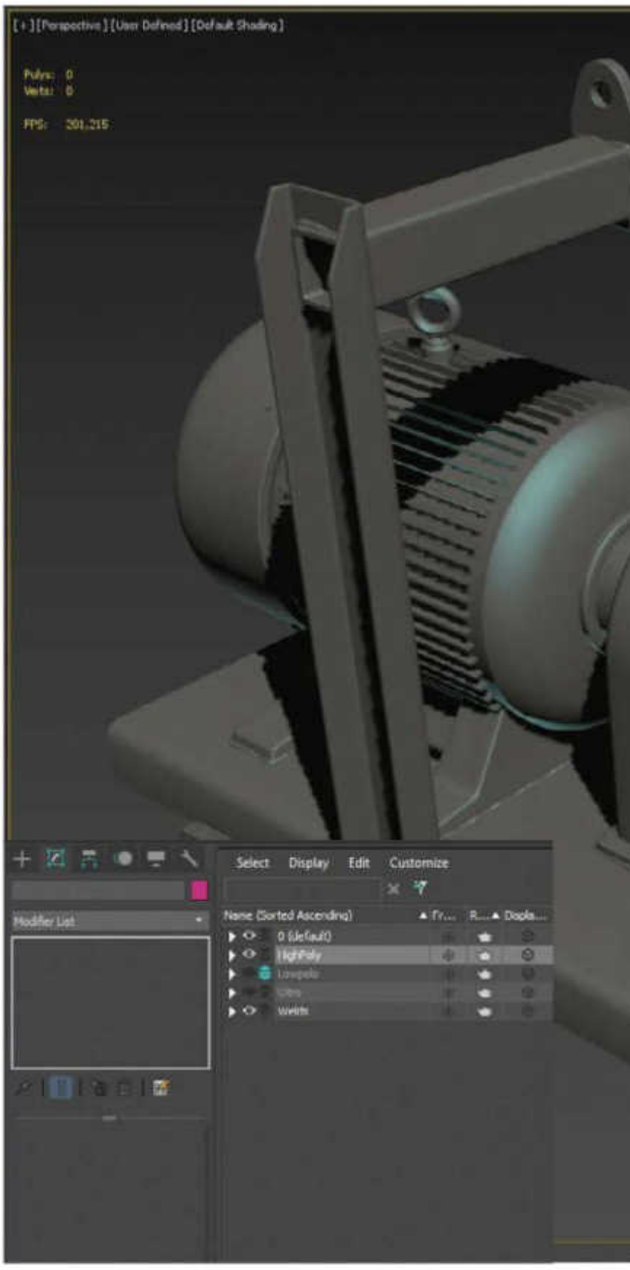
Asset Library is another new interesting tool, a browser that enables you to explore your whole computer/network visually, making it easier to find and work with material you've already created. Performance has definitely improved when we look at folders indexed previously.

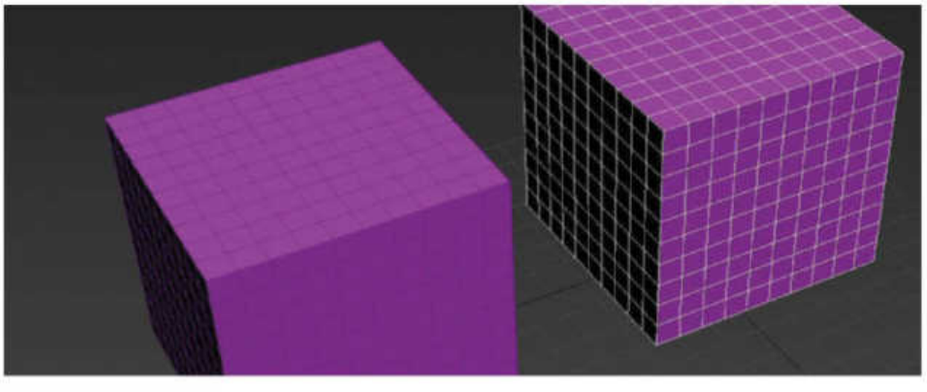
3ds Max now supports high DPI display, scaling the UI correctly and making it legible, no matter what resolution or screen we are using.

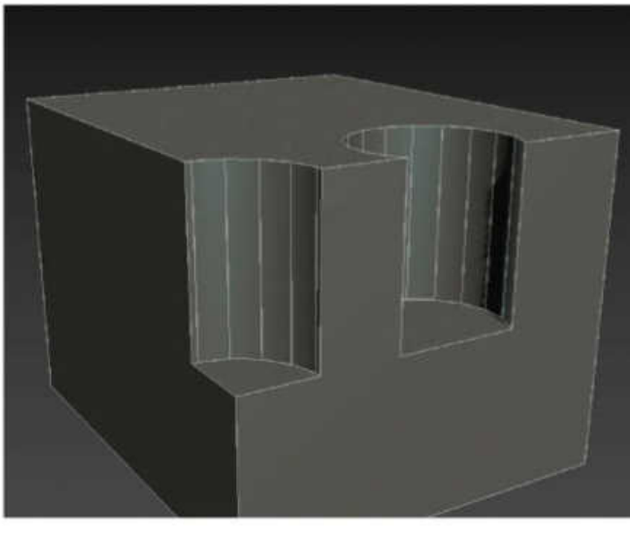
Overall, Autodesk has tried to make some operations less tedious, making a special point to simplify and speed up some of 3ds Max's old tools. The Stingray shaders and connections could be interesting for users of the new engine. New icons and the user interface are now much nicer, but it feels like learning a new software – even for some tools that we have been accustomed to.

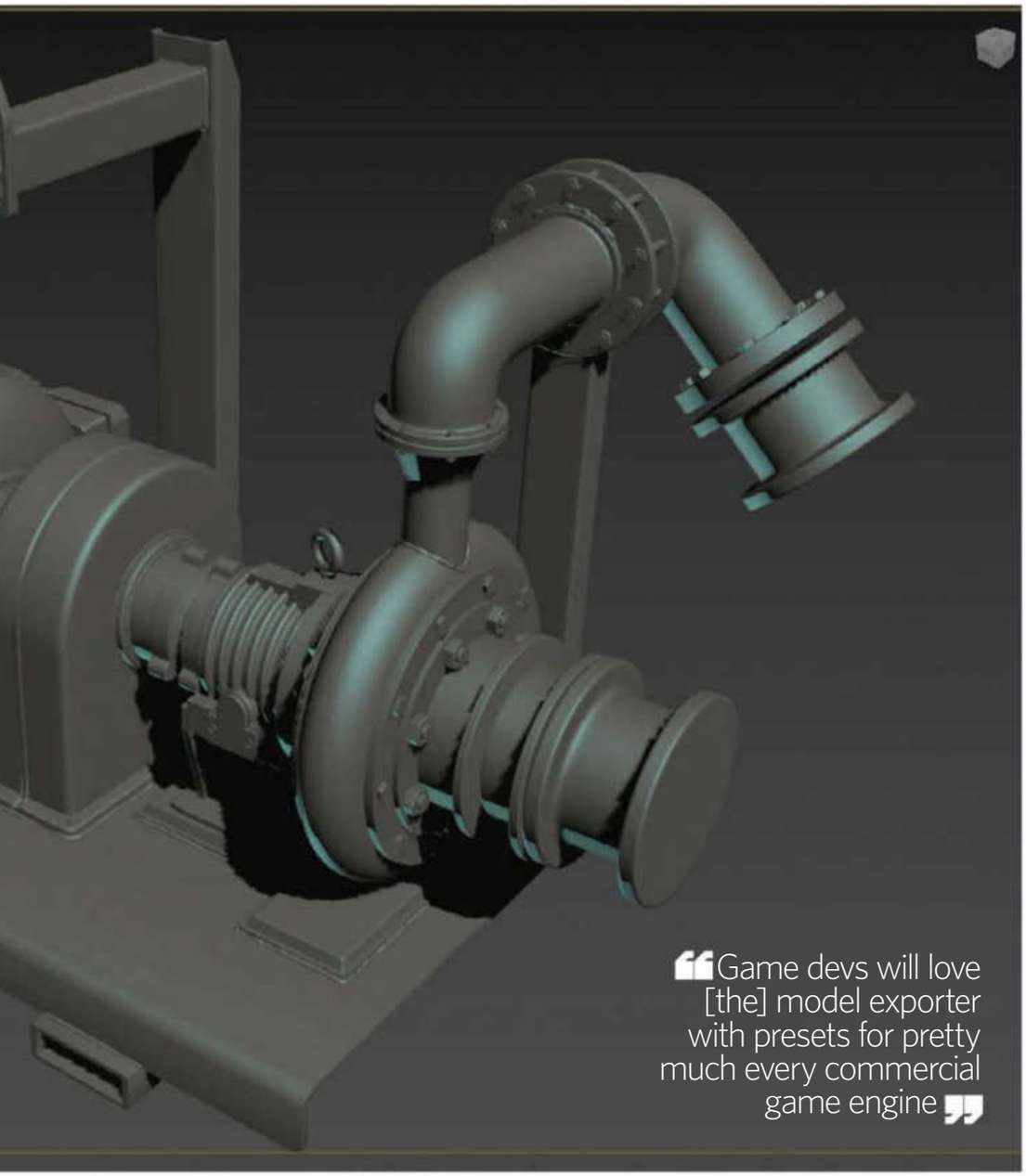
We have seen most of these features in competitor software already, which makes 3ds Max 2017 slightly necessary for traditional users not willing to jump into completely new 3D packages. It's another little step that takes 3ds Max closer to the new era.

Ayi Sánchez







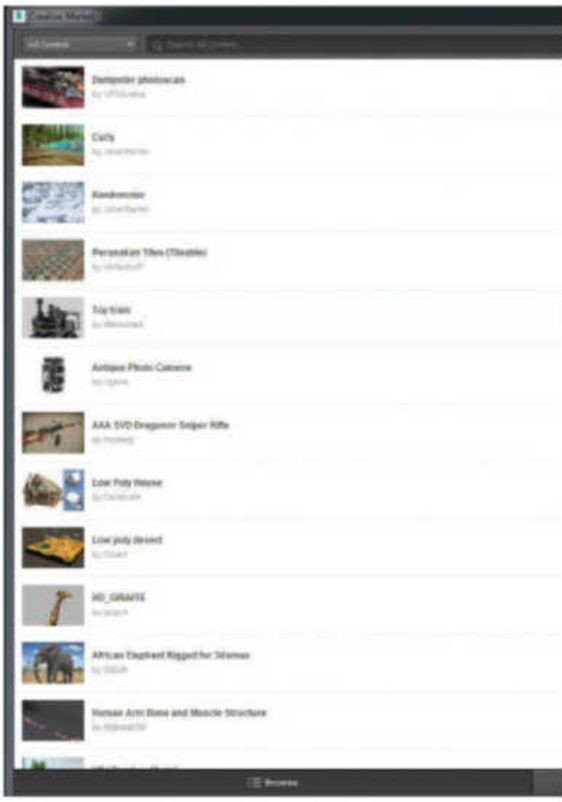


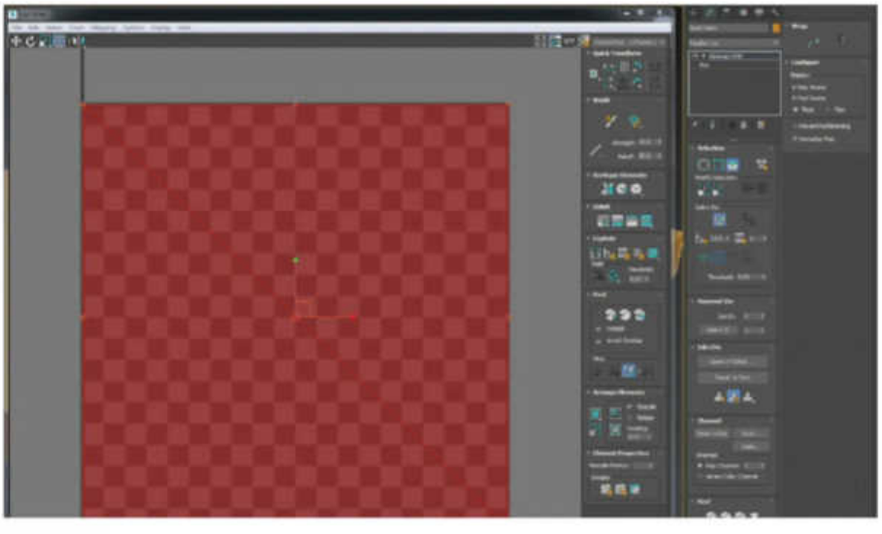
MAIN Autodesk has done well to ensure that 3ds Max 2017 continues to be one of the best options on the market as a complete 3D package

BOTTOM LEFT The new Local Align option tries to line up each axis after applying different transforms to a sub-object selection

BOTTOM MIDDLE Operhands are faster and more precise now, making it easier for hard-surface modelling tasks

BELOW You are now able to buy and sell content through Creative Market Integration, which is implemented directly in the interface





Essential info

Price	£145 per month
Website	autodesk.com/products/3ds-max/overview
OS	Windows7 (SP1) and up 64-bit only
CPU	64-bit Intel or AMD multi-core processor
RAM	4GB
Disk Space	6GB
Pointing device	Three-button mouse

Summary

- ★★★☆☆ **Features**
- ★★★★☆ **Performance**
- ★★★★★ **Design**
- ★★★☆☆ **Value for money**

Verdict ★★★★☆

This is certainly an update with faster and smoother tools, updating and modernising the old features alongside new content too

Maya 2016 Extension 2

In lieu of the usual annual full release, Autodesk has rolled out a second extension to Maya 2016

With Autodesk phasing out perpetual licences this year in favour of subscription services, it's understandable that Maya 2017 has been delayed and Extension 2 (which is only available to subscribers) has filled its place. The free upgrade has plenty to offer and chief among them is an enhanced version of the recently acquired procedural animation toolkit MASH, which expands Maya's repertoire with a more dedicated motion graphics and visual effects procedural system. After creating a MASH network, in the Attribute Editor you'll find the Waiter. This hosts the MASH tools and a Presets rollout that links to the new Content Browser replacing the Visor.

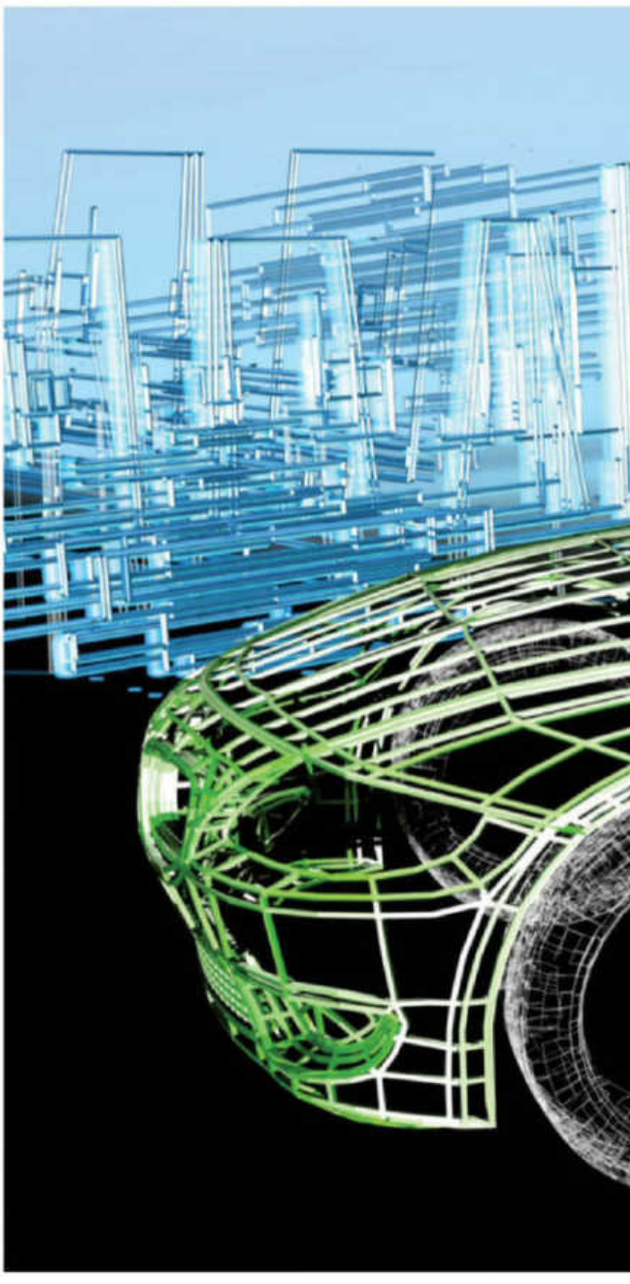
Working with MASH is fun but it doesn't have the most fluid workflow. This is perhaps a personal bugbear, but as you build up ever-complex scenes and networks by chaining nodes (as you may expect a related node tab is created in the Attribute Editor), over time finding settings you want to adjust involves plenty of rummaging about. Instead, some form of layer-based approach as an alternative would be our preference. Keeping the Outliner open is also advisable for middle-mouse drag and dropping geo into fields, which takes up more screen space. As a tip you can utilise the delete button in the Delete Rollout of the Distribute tab to cleanly remove a MASH network. It is a powerful toolset addition for motion graphics and UI artists, and hopefully over future releases will become more refined.

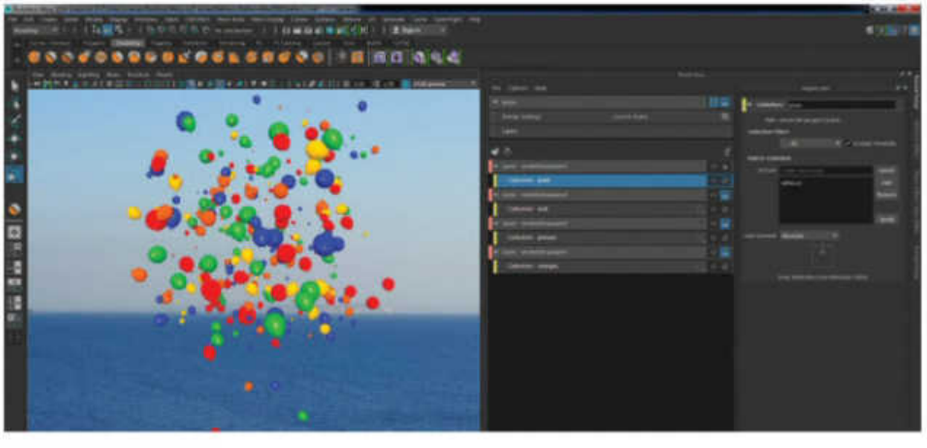
For novice riggers, the new Quick Rig tool (which is already in Maya LT Extension 3) offers a HumanIK rig and basic skinning solution for bipeds. You can either let Maya take care of the entire process or work through each step semi-automatically. After trying both methods, you'll want to go step by step for more unconventional bipeds. Ideally these tools will be expanded for quadrupeds and more. The skinned character can then have corrective shapes introduced using the new Pose Editor. It works by driving Blend Shape Weights through Joint transformations and is a step forwards from previous incarnations with the feel of a finished toolset. It's also really easy to learn and couples well with the recent addition of Mudbox sculpting tools. Blend Shapes have a new home, in the new Shape Editor (also ported from Maya LT Extension 3). There are a bunch of useful additions here such as Soloing, Mirroring, Duplicating, Grouping, Import and Export, making it easier to manage and control Blend Shapes. As with the Pose Editor, it feels like a finished toolset.

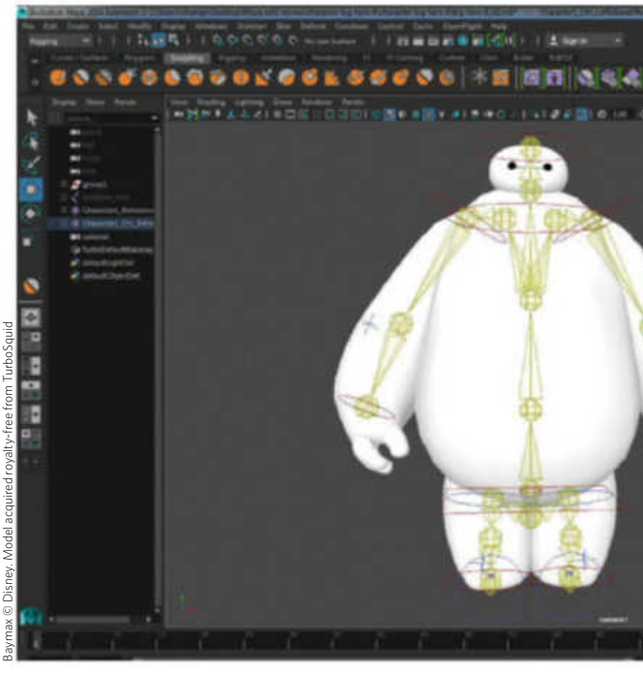
Also revamped is the new Render Setup system, which replaces the layer system. Workflow is a little different as Layers are populated by Collections, which in turn contain the objects you want in your render. You can make as many Collections as you need and then add Overrides for any of them. There are a couple of ways to add objects, with the simplest being drag and drop from the Outliner. Usefully you can populate a collection using expressions with wild cards, which is a neat feature for pinpointing and collecting assets in heavy shots. Import and Export uses JSON templates so they can be quickly applied to other shots and the format supports notes too.

There are also a stack of smaller time-saving features such as extra Camera controls, Match Transformations options, Level Of Detail setups, a new Light Editor and some welcome modelling improvements for Extrude, Bevel, Bridge, Mirror and more. While this release isn't the full 2017 package as anticipated, it's a valuable upgrade nonetheless for Maya, with a strong emphasis on improvement and ease of use for a variety of ageing tools and workflows.

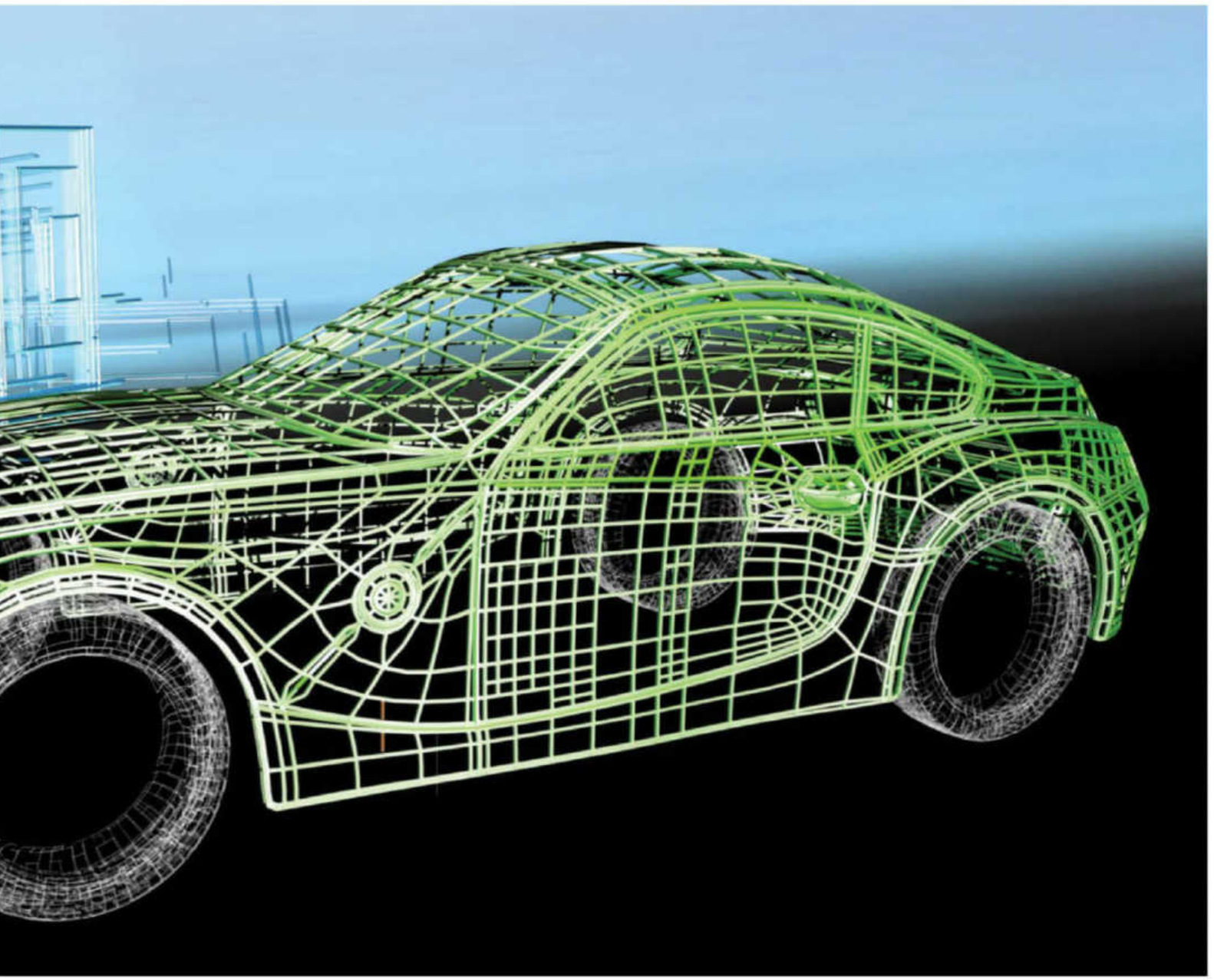
Paul Champion

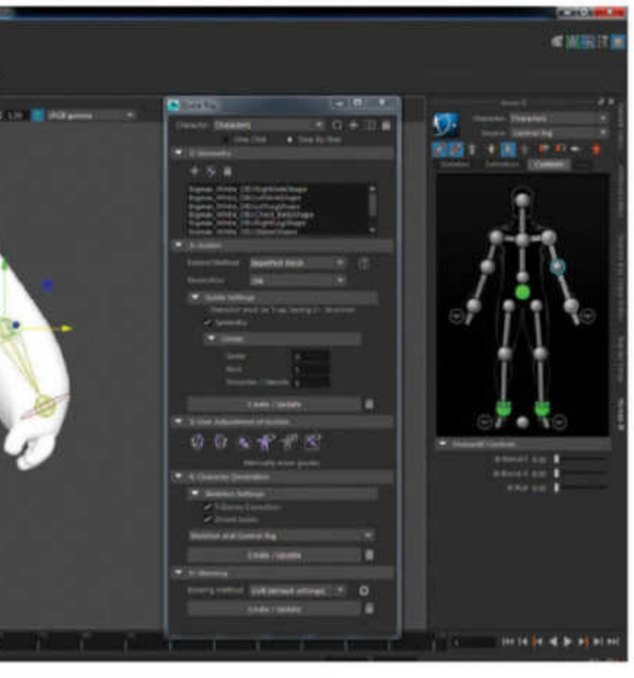


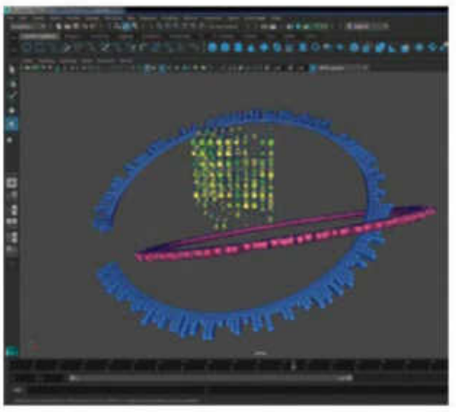




Baymax © Disney. Model acquired royalty-free from TurboSquid







MAIN Creating motion graphics is tremendously fun, and now Maya includes the advanced tools you need to produce captivating projects

FAR LEFT Render Setup makes it easier to manage complex scenes, with the options to add shot-based Overrides and create templates for use on other shots

LEFT Maya's new Quick Rig tool caters for novices who need to rig and skin bipeds. It comes in two flavours, One-Click or Step-By-Step

Essential info

Price	£174 per month / £1,404 per year
Website	autodesk.co.uk
OS	Windows 7 and up 64-bit only / Mac OS X 10.9.5 and up 64-bit only / Linux 6.5 WS and up 64-bit only
RAM	4GB
CPU	64-bit Intel or AMD multicore processor
HDD	4GB
Mouse	Three-button

Summary

★★★★½ **Features**
★★★★½ **Performance**
★★★★½ **Design**
★★★★★ **Value for money**

Verdict ★★★★½

Worth upgrading for the MASH tools alone, everything else is icing on the cake

3DArtist ENJOY MORE OF YOUR FAVOURITE CGI

SUBSCRIBE & SAVE UP TO 37%*

FREE 9GB OF VIDEOS & M
Practical inspiration for the 3D community
3DArtist
POWER UP ZBRUSH
Achieve your best ever renders
Master ZModeler and more
23 pages of essential guides
IMAGE
INCREDIBLE ANIMATION
EXPERT SCULPTING
V-RAY RENDERS
FREE 6GB OF VIDEOS & MORE
3DArtist
NEW UPDATES REVEALED
3DS MAX & MAYA
KITBASH CONCEPTS
FIRE UP YOUR MODELLING
• 5 expert workflows • Pro sculpting & hard surfaces • Advanced techniques explored
IS THIS THE BEST MOCAP EVER?
PRO TEXTURING FOR GAMES
5GB OF FREE ASSETS VIDEOS, MODELS & MORE
3DArtist
THE ULTIMATE BLENDER MASTERCLASS
Alexandrov Williamson Kennedy Kaspar
4GB OF FREE ASSETS VIDEOS, MODELS & MORE
3DArtist
INSTANTLY UPGRADE YOUR MAYA SKILLS
40 EXPERT TIPS
BUILD A PRO LEVEL PC FOR ONLY £2,000
WIN AN OSCAR
LG

*US Subscribers save up to 40% off the single issue price.

See more at: www.greatdigitalmags.com

MAGAZINE FOR LESS WHEN YOU SUBSCRIBE!

Every issue packed with...

- Exclusively commissioned art
- Behind-the-scenes guides to images and fantastic artwork
- Interviews with inspirational artists
- Tips for studying 3D and getting work in the industry

Why you should subscribe...

- Save up to 37% off the single issue price
- Immediate delivery to your device
- Never miss an issue
- Available across a wide range of digital devices

Subscribe today and take advantage of this great offer!

Download to your device now

Building new worlds in virtual reality

Discover how director Hasraf 'HaZ' Dulull harnessed the power of HP Z840 workstations and AMD FirePro GPUs to create 360-video experience, Spirit City

VR has been carving out a path for itself for a number of years now, with key players hitting the consumer market with their headsets in 2016 after years of development. VR and games are, to most, a match made in heaven – a tangible application for new VR experiences and techniques that immerse you fully in a game world.

However, VR's reach is far wider than just videogames – in film-making and visual effects, VR presents a huge opportunity for artists and directors to create immersive experiences utilising core 3D, animation and rendering practices. Over the last couple of years these experiences have struggled to forge a place for themselves – the industry is still in the process of trying to establish the best practice for film-makers looking to exploit the most disruptive medium of the decade and develop new workflows to get the very best out of virtual reality.

> "The speed of the HP Z840 workstation helped me think creatively as a film-maker. I found myself throwing more and more effects at it because I knew I had the processing power. It was almost like the machine was pushing me to come up with cool ideas"

Hasraf 'Haz' Dulull
Director and visual effects artist

One director that is actively trying to shape the medium and pioneer new workflows is Hasraf 'HaZ' Dulull, a director from a VFX background – having worked as a compositor on major feature films including *The Dark Knight* – who has rapidly made a name for himself with his incredible proof-of-concept films such as *Origin Unknown* and 'SYNC'.

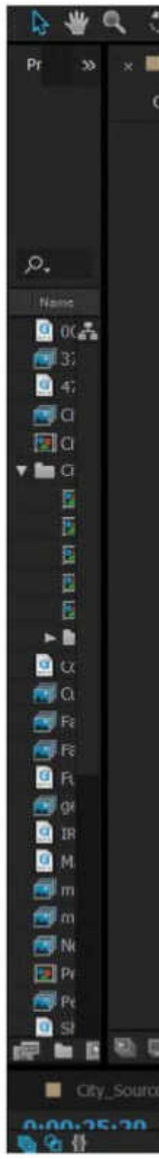
"Directors are still trying to figure out the best ways to tell stories in VR," begins Dulull. "This is my way. I'm not spoon-feeding the audience, but I'm putting them in a situation where there are visual clues everywhere for them to figure out the story." The story he's referring to is Spirit City, a VR project for immersive content developer Virtual View Productions. "People have different ideas of what's going on: that this is a police city and they're a criminal, or a cop. I like that. That's immersive storytelling." Spirit City is a virtual reality film that puts you inside a car that sits in a luminescent, mysterious city environment, with a gun on the back seat and a bullet hole in the windscreen.

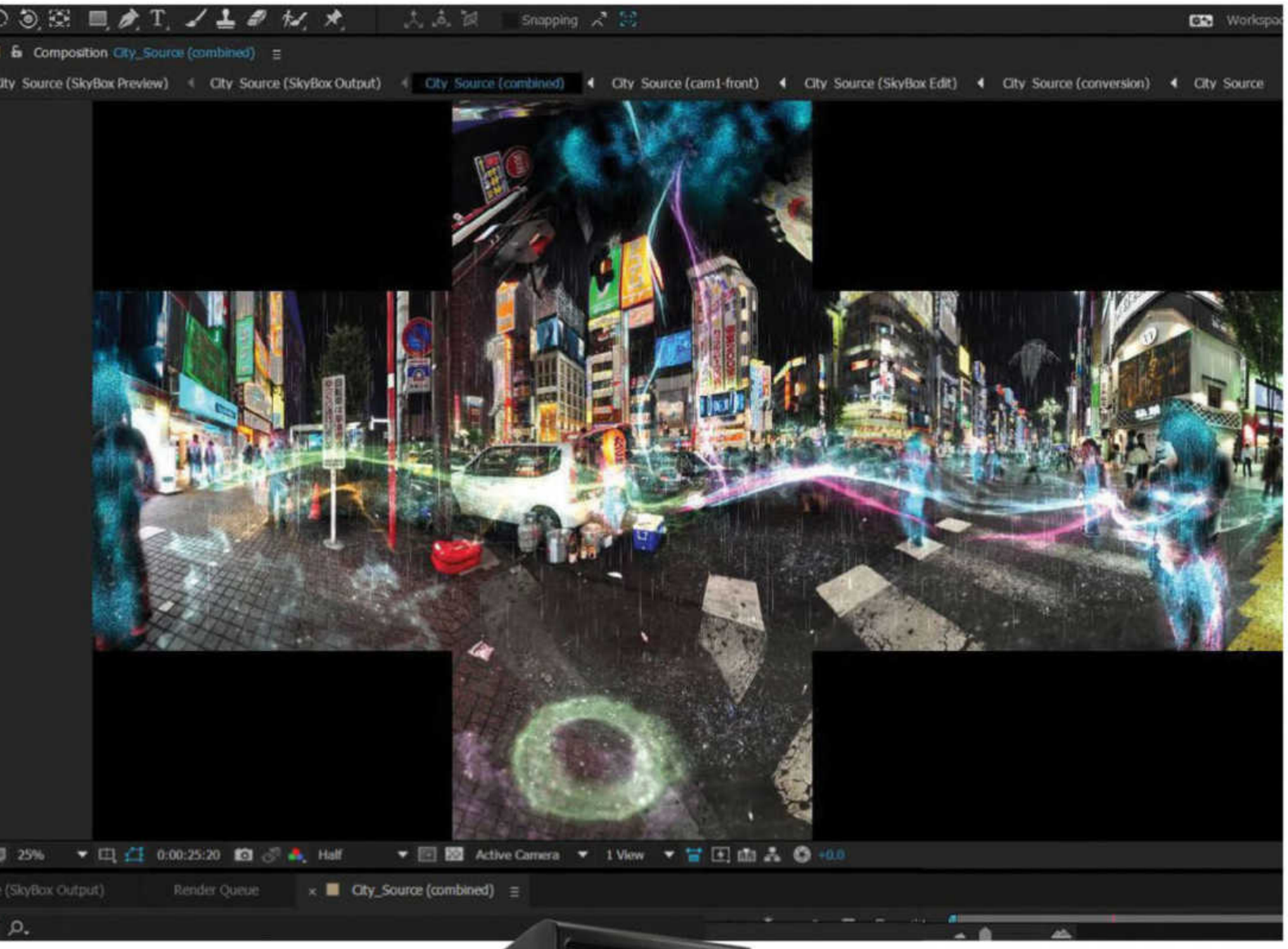
NEW WAYS OF WORKING

Naturally, though, it's crucial for any budding director, artist or developer looking to work with VR to gear up with the best tools for the job. By utilising HP Z840 workstations and AMD's top-end FirePro W9100 professional graphics cards, Dulull injected his workflow with enough power to be able to iterate and deliver quickly, which is crucial across all VFX work, not just VR and 360 video.

Since he turned to directing after a career in VFX for film and TV, HaZ has garnered a reputation for developing streamlined workflows that allow him to create industry-standard films and experiences quickly and cheaply, often by relying on his extensive knowledge of VFX and opting for digital solutions to real-world problems. Spirit City was no exception.

"I didn't want to go out and hire camera rigs, crews etc, to shoot live-action footage for a pitch or





HaZ combined HP Z840 workstations sporting AMD FirePro W9100 graphics cards and the Adobe Creative Cloud suite of apps to create the Spirit City proof of concept. The whole project took just over a month to deliver

> I was getting almost real-time feedback on distortion effects, scrubbing through the timeline of the After Effects file to see how things moved. None of that would have been possible without AMD's FirePro W9100

Hasraf 'Haz' Dulull
Director and visual effects artist

previs," explains Dulull. "There are already a lot of 360-degree videos out there. Instead, I wanted to create something immersive entirely in visual effects and compositing with minimal external resources – pretty much myself since it's a pitch."

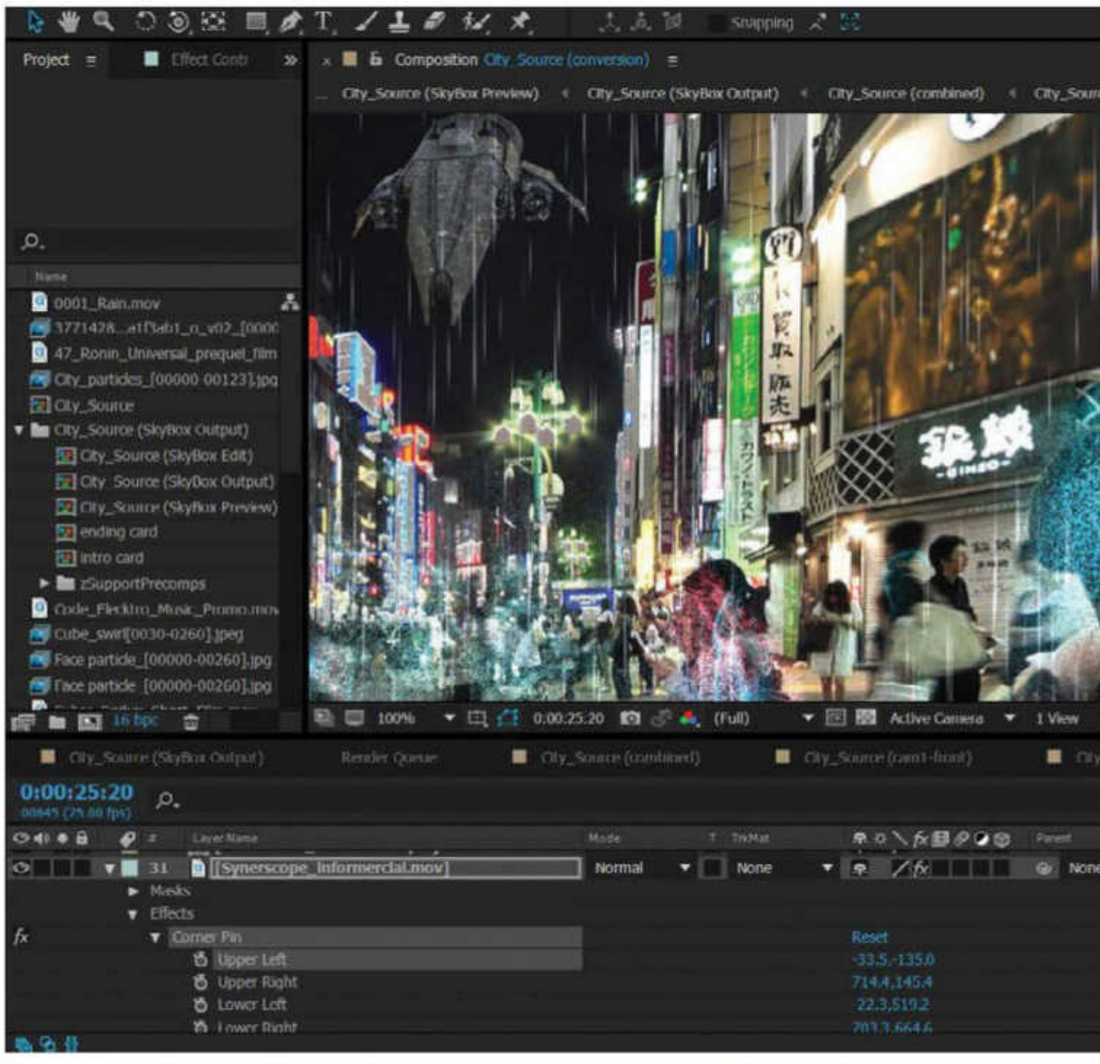
The car and environment are entirely constructed from still images. Dulull stitched the source material together using PanoStitcher, bringing the resulting equirectangular image first into Adobe Photoshop CC to refine manually, and then into Adobe After Effects CC, where Mettle's SkyBox plugin converted the flat image into a cubic environment.

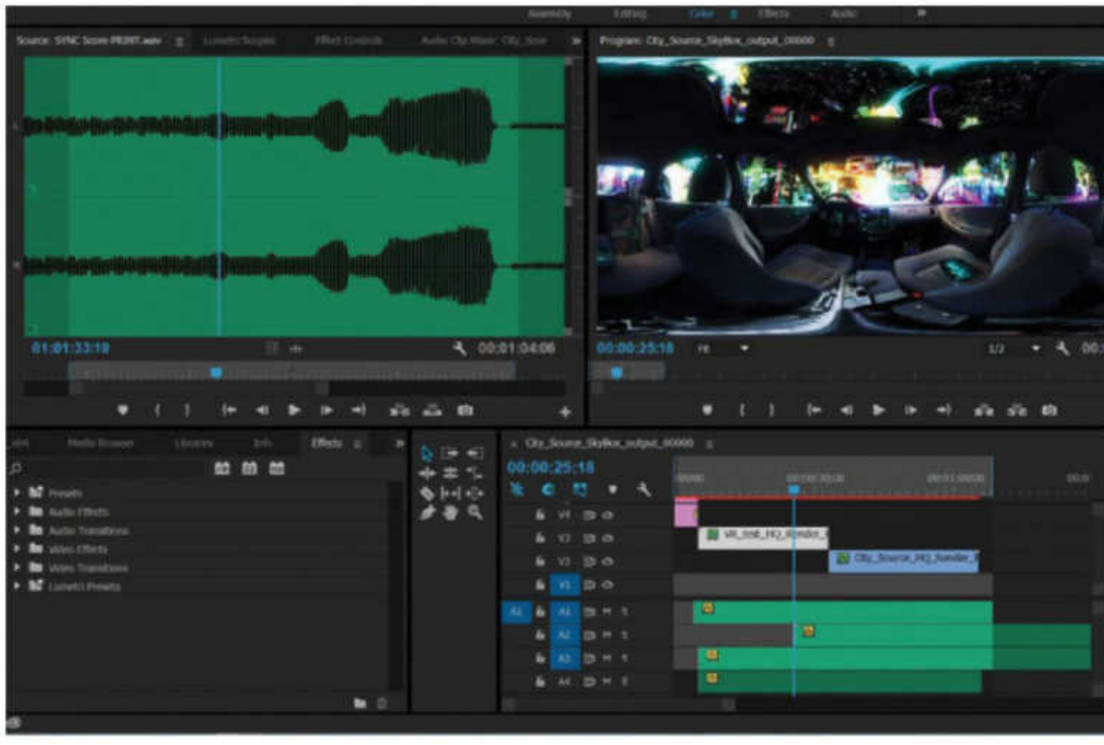
Dulull then began to composite in live-action visual effects elements such as rain, using Mesh Warp and Adobe After Effects CC's other distortion tools to match the footage to the environment. The strange faces in the sky above the city were created by taking slow-motion footage of an actor talking and passing it through Adobe After Effects CC particle effects plugins Trapcode Particular and Trapcode Form.

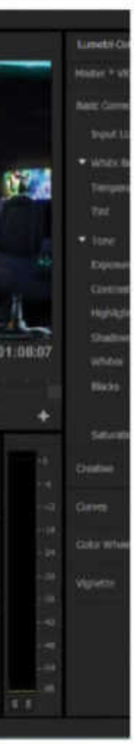
Once compositing was complete, Dulull rendered the project out of After Effects as a series of equirectangular images, importing them into Adobe Premiere for colour grading and to add audio. The footage was then rendered out as an MP4 file and uploaded to YouTube as a 360-degree video, where Dulull could check the results using Google's low-cost Cardboard headset. The finished film was then reformatted for final-quality display in a Samsung Gear VR headset.

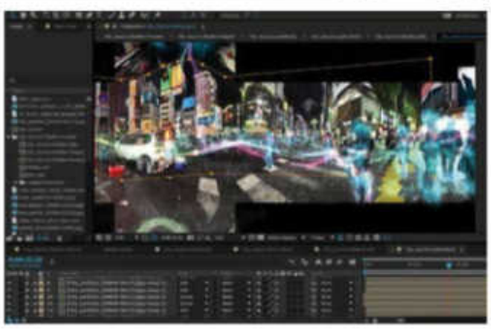
TOOLS OF THE TRADE

Like any project involving extensive VFX and compositing work, Dulull needed a hardware solution he could rely on in order to deliver the Spirit City pitch on time and to an extremely polished standard. At first, he was relying on his old laptop to render the project, which resulted in each iteration taking around

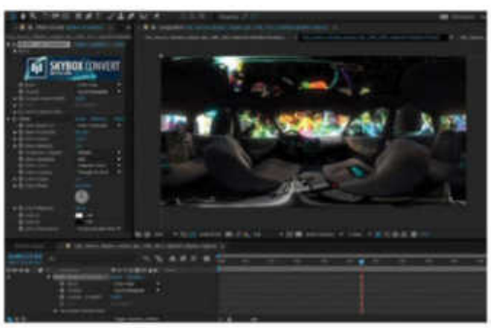








The city environment in Spirit City, which was developed from photographs of Tokyo, is a visual delight. All of the luminescent colour trails are a real assault on the senses



44 hours – a timeframe that was unsustainable. By making the jump to an HP Z840 workstation boasting dual Intel Xeon E5 v3 processors these times were slashed to 12 hours per iteration.

"The speed helped me think more creatively as a film-maker," reveals Dulull. "I found myself throwing more and more effects at the workstation because I knew I had the power. It was like the machine was pushing me to come up with new ideas."

Another key facet of the setup was the twin AMD FirePro W9100s installed in the HP Z840. With their combined 10.48TFLOPS of peak single-precision floating-point GPU compute performance and 32GB of GDDR5 memory, the AMD FirePro cards enabled Dulull to preview the work at the resolution he needed, without lagging or stuttering.

"I wanted to preview everything at as high a resolution as possible so that I could make sure the edges of the images were really well stitched," he says. "With my existing laptop, I had to use half-resolution just so that I could look around. On the HP Z840, I was getting almost real-time feedback on distortion effects, scrubbing through the timeline of the After Effects file to see how things moved. None of that would have been possible without those graphics cards."

The AMD FirePro W9100 GPUs also proved critical when it came to colour correction. "I would take it into Premiere and use the new Lumetri colour wheels to get a really nice grade," he says. "You can put a box around an area and grade it like you would in DaVinci Resolve or Baselight, and you're doing it on a 5K equirectangular image – in Premiere!"

LESSONS LEARNED

Thanks to the power of the HP Z840 workstation and AMD FirePro W9100 GPUs, Dulull was able to complete Spirit City in time for CES 2016, where Stuart Gallop – CEO of VR entertainment company Virtual View Productions – used it to help pitch the IP to investors. The entire project had taken just over a month, from inception to delivery.

For Dulull, the short represents an important proof of concept for VR film-making. "I meet so many film-makers who have these fantastic ideas for VR, but they're all theoretical," he says. "With Spirit City, I've actually gone out and tried it. Whether I've succeeded or failed artistically, I know what is required to create complex, VFX-driven 360 video."

While Spirit City uses only two fixed camera positions, Dulull now plans a series of further VR tech demos exploring how the same 2.5D effects methodology can be applied to films that require a moving camera: work in which AMD and HP's hardware will play an integral part.

"One thing I've learned on this project is that for VR, if you're going to do visual effects-heavy content, you need a beast of a machine – and most importantly, a beast of a graphics card so that you can see what you're doing in real time," he says. "On my future projects, I will most definitely try to get a workstation of the same spec as the HP Z840 and the AMD FirePro W9100 GPUs."

HaZ'S SETUP AT A GLANCE

Application
Adobe Photoshop CC
Adobe After Effects CC
Adobe Premiere Pro CC
SkyBox plugin

Hardware
HP Z840 workstations, configured with:
- Dual 10-core Intel Xeon E5 v3 OpenCL 2.0
- AMD FirePro W9100 graphics card
- 32GB of GDDR5 memory
- 512GB SSD OS Drive Win 8.1 64-bit Pro
- HP Z Turbo Drive PCIe SSD 512GB
- HP Z Turbo Drive Quad Pro
- HP DreamColor Z27x Studio Display

Memory
16GB GDDR5

Compute performance
Up to 5.24 TFLOPs peak single precision floating-point performance

AMD Eyefinity technology
Support up to 6 displays

Supports
OpenCL 2.0

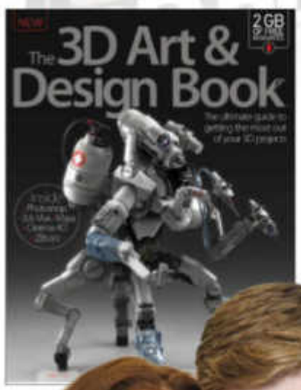
From the makers of 3DArtist

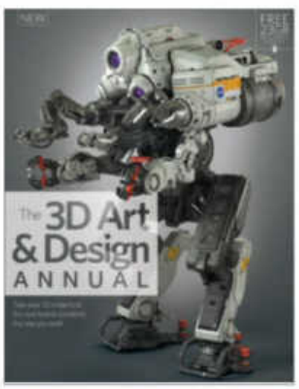
3D MAKE & PRINT

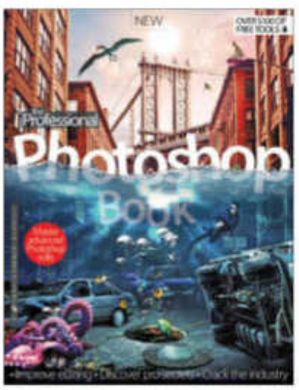
NEW
START HERE: MODEL, PRINT & BUILD
3D MAKE & PRINT
DESIGN, & MAKE...
FREE 100 PRINTABLE MODELS
CREATE YOUR FIRST 3D MODEL
OVER 50 PAGES OF START-TO-FINISH PROJECTS
PICK THE PERFECT PRINTER
3D PRINT YOUR HEAD
EVERYTHING YOU NEED TO KNOW ABOUT
3D PRINTING

3D printing is our future. Whether it be a simple decoration, or a fully working prosthetic, 3D Make & Print will take you through how this phenomenon is going to change everybody's lives and teach you how to get started with your own projects!

Also available...







A world of content at your fingertips

Whether you love gaming, history, animals, photography, Photoshop, sci-fi or anything in between, every magazine and bookazine from Imagine Publishing is packed with expert advice and fascinating facts.

BUY YOUR COPY TODAY

Print edition available at www.imagineshop.co.uk

Digital edition available at www.greatdigitalmags.com

Print Tablet Phone Desktop

The Hub

The inside guide to industry news, VFX studios, expert opinions and the 3D community

"It was completely natural to me that we should have a chief customer officer to embody that commitment and to ensure we cherish them"

Alex Mahon, CEO of The Foundry, on Jody Madden's new role

090 Community news

Artomatix

Dr Eric Risser explains how his company's new tool will empower small developers and bolster artists

092 Industry news

MARI

The texture painting software joins NUKE to go non-commercial – we look at how this will affect users

094 Social

Readers' Gallery

The latest images created by the **3dartistonline.com** community

To advertise in **The Hub** please contact Simon Hall on **01202 586415** or **simon.hall@imagine-publishing.co.uk**

Will this tool resurrect indie studios?

Dr Eric Risser explains how the cloud-based service at Artomatix and automation will free up artists and smaller studios for more creative tasks

Artomatix will "get rid of those mundane tasks we've all had to do," explains Dr Eric Risser when we asked him about what the cloud service does and why the startup has been so successful. "Say you've got to put more scuff marks on a wall – with procedural practices you'll have to write in what you want... you'd have to program that every four to eight centimetres a scuff mark taken from a depository will be placed on the wall. You'd be writing out parameters. We automate away all that, by having the computer learn itself how to do that from examples... That's where we're different from your procedural practices: we're data-driven, our algorithm learns from the data you give it."

Risser's dream is to reignite the videogames industry, and close the widening gulf between indie developers and the behemoth triple-A studios that all but dominate the videogames industry nowadays. "Art creation is the biggest expense in the industry and the biggest cause of lengthy project timelines," Risser explains – and he's right.

Dr Eric Risser, founder of Artomatix

According to adjusted LinkedIn data, an estimated 41,000 artists across the globe create and apply textures on 3D models and environments for industries like videogames. Texturing represents 28 per cent of the €4.3 billion visual art creation for the videogames market – that equates to €1.2 billion overall. Artomatix wants to streamline that process by using its data-driven toolset to help independent and smaller studios compete effectively with the mammoth studios who employ hundreds of staff and will also have the budget (and time) to dedicate to asset creation.

"We think using tools like ours will just allow games to be made bigger and better, in an easier way," Risser explains. It's estimated that most console games that ship on disc only fill half of a Blu-ray's full capacity, and Risser wants to remedy that.

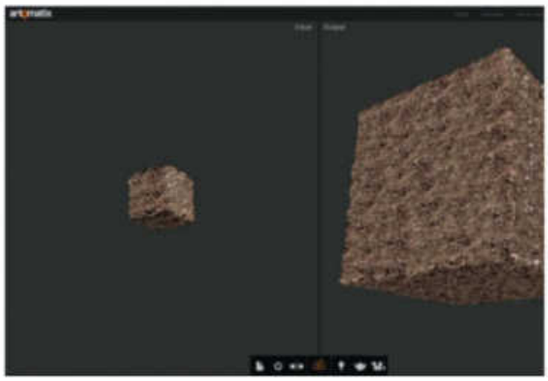
"So our view is that we've got the computer horsepower to render bigger, better, more detailed worlds, but not the manpower to do it. So Artomatix plans to close that gap, because otherwise it's just going to widen and widen and widen, and it's leading to unhealthy aspects in the industry."

We're already seeing tools like Surface being used more and more in the games industry to speed up asset creation, but Risser wants to clarify that Artomatix is a whole different breed: "I guess you could say we're superficially similar to Surface and Houdini and all those other procedural approaches out there. Think of the procedure as a recipe for how to make a piece of art – the same way you'd have a recipe for a piece of cake. If the computer kept following that, it could keep making cake.

"Procedural approaches are like that: a computer can take it and keep outputting the same piece of art, and you can of course add random values in there that can, say, alter how many layers that cake has, or how sweet it is or whatnot... you can manually control the boundaries.

"Artomatix is quite different. To follow the recipe analogy Artomatix is like having a personal chef: give the chef cakes you like and the chef will taste them and figure out how to make cakes that are quite like that. Our unique proposition is time-saving: we're not necessarily competing with the procedural side of things, but where we kind of shine is that we can take those annoying jobs that you'd have assistant artists working on – removing seams, making more of a unique texture that doesn't look like it's being repeated. We can kind of automate that low-level creativity using data-driven tools."

So this kind of tool is promising for studios that want to position themselves against the triple-A monopoly, but it might come across as intimidating to artists looking for an 'in' in the games industry: it was that kind of assistant role that was typically entry-level. If automated approaches like Artomatix take off, it could be wonderful for the industry as a whole, but damaging to the prospects of budding artists looking for that break in games...



Artomatix's tool will allow smaller studios to generate textures and get rid of seams with ease, freeing up artists for more creative tasks

Jody Madden's new role will be concentrated on enhancing customer relationships for The Foundry

The Foundry goes customer-first

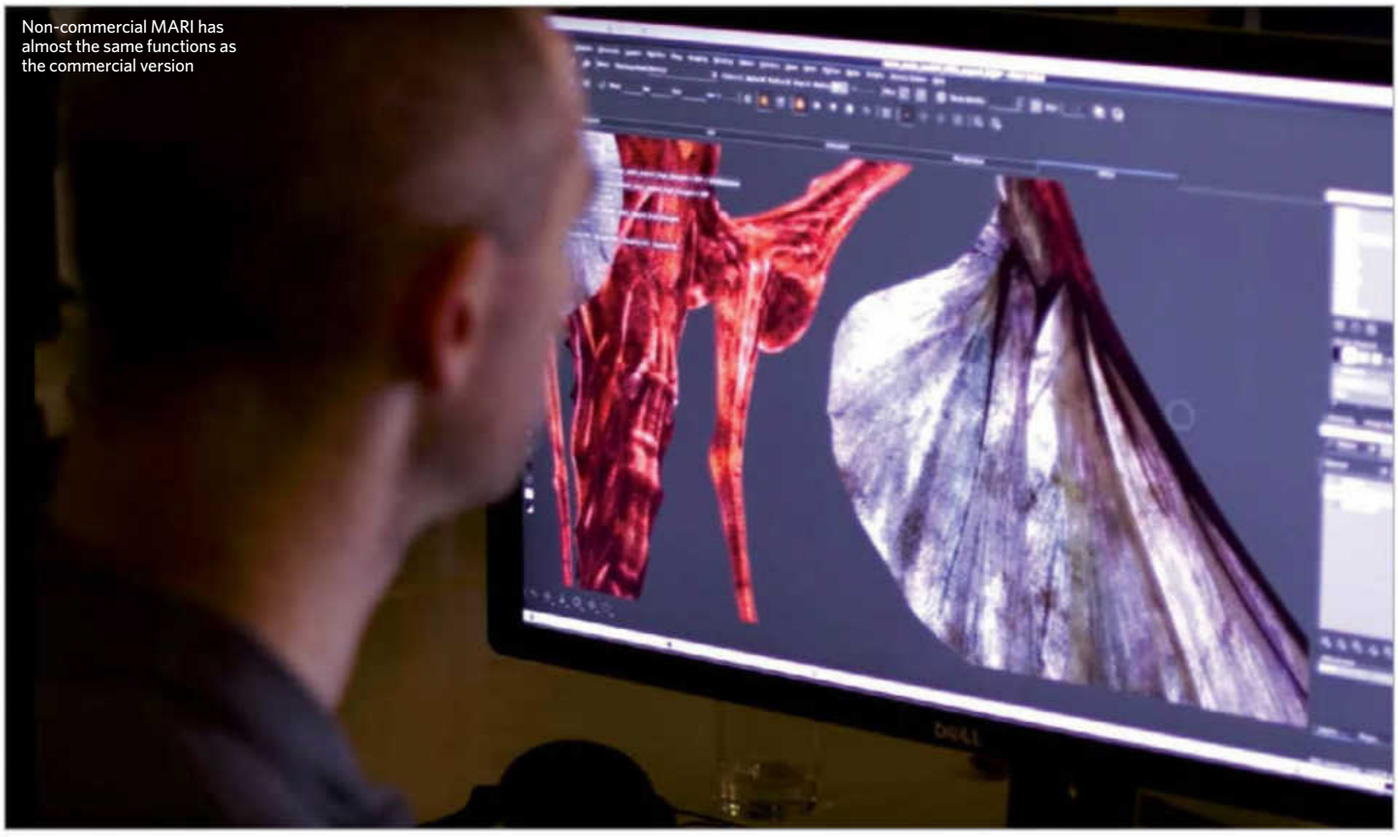
Following the appointment of Alex Mahon to CEO, Jody Madden is appointed to the role of chief customer officer

Madden previously held positions such as COO and head of production at The Foundry, and her new role has been created to reinforce the company's renewed efforts on a customer-centric approach and commitment to being part of the technical innovation in the industry.

What does these changes mean for you, as the customer though? Basically it means that The Foundry has identified that the very best tools in this industry are built by their users – looking across to engines and toolsets including Unreal, Blender, Unity and many others. The Foundry must see strength in the wider 3D community and is aiming to foster that sort of service/customer relationship itself within its company.

"Our customers are one of our most precious assets," explains The Foundry CEO Alex Mahon. "We are focused on responding to their challenges and on how we can help solve them; we understand the importance of creating solutions that enable them to achieve better results. It was completely natural to me that we should have a chief customer officer to embody that commitment and to ensure we cherish them."

This shift in focus towards customer and studio is quite telling for The Foundry – with such a large and diverse body of customers, it makes sense for the company to double down on customer relations and encourage communication at all levels of production.


Non-commercial MARI has almost the same functions as the commercial version

Enjoy Avatar-standard texture painting for free

MARI is the latest top-end VFX tool to go non-commercial

The multi award-winning texturing tool MARI has made the jump and released a free version. It's The Foundry's second product to be made available at no cost (after the company released a free version of NUKE last year), and is being cited by The Foundry as a non-commercial tool for use by student or hobbyist VFX artists.

Style over Substance?

Substance Painter is taking the VFX scene by storm – the gaming side of it especially so. It could be said that The Foundry's decision to release MARI non-commercial is aimed at convincing users to side with them over Substance Painter: it's cheaper and quicker, but can't handle the resolutions MARI can (for now at least).

MARI enables artists to texture 3D meshes for use in VFX and animation, videogames, VR and stills. The commercial version has been used on shows like Weta's *Avatar*, *The Avengers*, *Gravity*, *Interstellar* and *Jurassic World* – so it's safe to say it's industry standard.

"With our non-commercial products, we want to give artists all the time they need to get familiar with the software," said Andy Whitmore, chief product officer at The Foundry. "They can work on personal projects such as making their demo reels stand out from the crowd, or simply use our extensive free tutorials to thoroughly learn the software – for as long as it takes."

The idea is to give non-professional artists the same tools professional artists use so they can experiment with layering, adjustments, procedurals and advanced masking techniques in personal projects that can help them get a leg up in the industry. There's no time limit on what the new free version of MARI offers, either, so amateur artists can experiment with the software as much as they want, whenever they want with access to professional-level workflows.

"Having a non-commercial version of any of the tools we use (and MARI is one of the important ones) is the best idea you could ever come up with," says Laurent Taillefer, CG supervisor at Atomic Fiction (the studio behind sequences in *The Walk*, *Deadpool*, *Looper*, *Game Of Thrones* and so on).

"When we hire people on our teams, something I pay a lot of attention to is how autonomous they are; for someone to be autonomous, having access to a non-commercial version at home is the best way [to learn]. You just install it, start to work, develop your skills, consider your questions and find out what's not working for you – so when you meet professional artists, you know exactly what to ask,

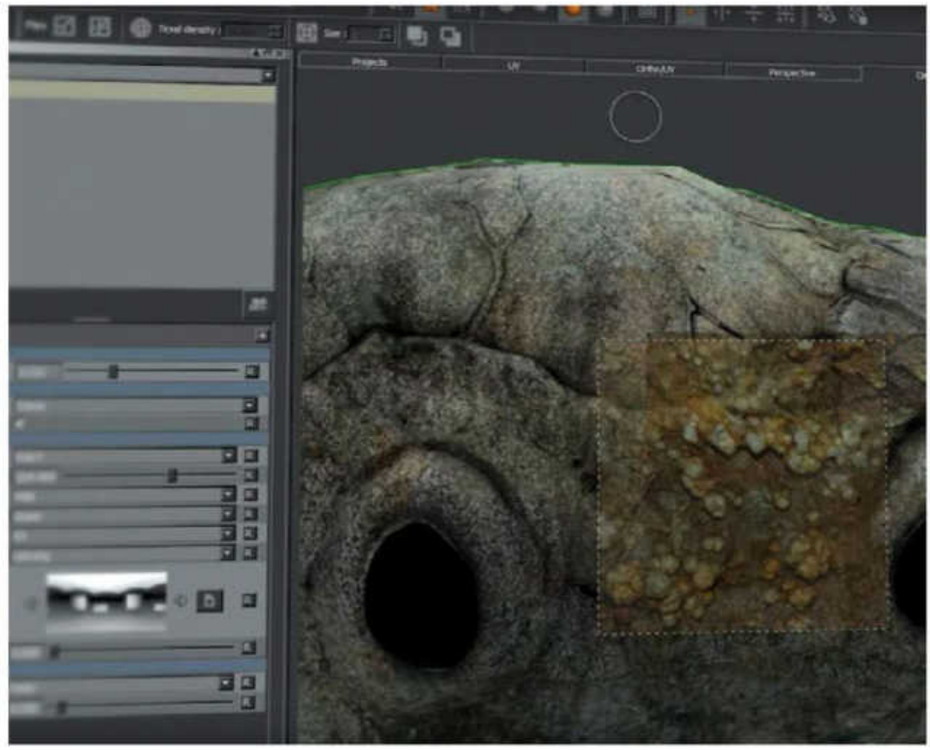
HAVE YOU HEARD? Comcast recently bought animation giant Dreamworks and all its IP for an astonishing $3.8 billion

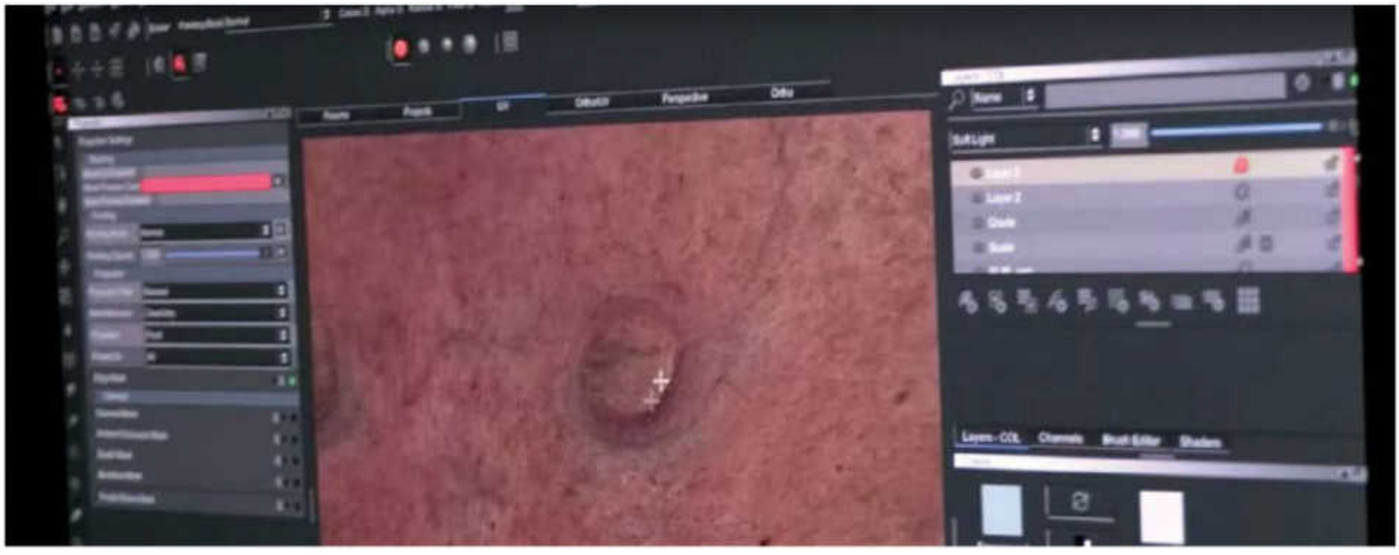
you know exactly what you need to work on and then you can just become a better artist."

Whilst many are taking the news of MARI's free launch in a positive light, it's worth noting there are some concerns echoing around the VFX community: the EULA has been dissected multiple times on various forums and some of the wording has been highlighted.

It's worth reading the EULA if you're considering using the software: it throws up some specific limitations as to MARI's non-commercial use. For example, if you're using it just to create images/projects for yourself, that's fine, but using it explicitly to create a project for a pitch isn't allowed. Basically, if you're creating a product for profit or to demo directly for a third party, you aren't allowed to use non-commercial software.

Despite some debatable wording and semantic play in the licence agreement, though, this is largely good news for artists: it's another addition to a growing wing of VFX tools that you can use to practise and refine your skills – something that is absolutely invaluable in the early stages of a VFX career. It'll be interesting to see if The Foundry ends up releasing a non-commercial version of other software like MODO or KATANA in the future, too.





Software shorts

Bringing you the lowdown on product updates and launches

VR-Plugin 5.0 for Maya

We're going to be seeing a lot more VR-specific tools appear for the big 3D tools in the coming months – the big update for the simply-titled VR-Plugin grants support to Oculus and the HTC Vive, an improved user interface, high FPS recording, a desktop that is viewable/useable in VR as well as dedicated gamepad controls.

Fabric Engine 2.2

Fabric Software has added Python support to canvas visual programming, making the system accessible to a wider range of technical directors and artists, and enabling better cross-pollination between departments. Fabric for MODO is also part of this 2.2 release, as well as an improved Script Editor with syntax highlighting for Python.

NVIDIA Iray for Rhino

Iray is integrated into Rhino, rendering directly within its viewports to give you continual, realistic feedback as you craft your model's form, materials and lighting. Iray's physically-based capability predicts the behaviour of real-world materials and lights, giving you accurate results with minimum setup or specialised knowledge.

DID YOU KNOW? The Foundry has been testing out its first MODO suite of procedural modelling tools with MeshFusion

Images of the month

These are the 3D projects that have been awarded 'Image of the week' on 3DArtistOnline.com in the last month

01 Audeamus

by David Munoz Velazquez and Francesc Camos
3DA username munozvelazquez
David Munoz Velazquez and Francesc Camos say: "'Audeamus', a latin expression for 'may we dare' or 'may we be eager for battle', is a collaboration piece between the two of us and describes a battle in the late Middle Ages."
We say: *As big history and fantasy fans, we fell in love with this incredible image straight away. The crowd work is fantastic and the details on the armour are awesome. It's extremely well lit, too.*

02 Marooned

by Saeed Amiri
3DA username saeedamiri
Saeed Amiri says: "The main scenario of this work had been formed in my mind when I saw Julien Coquentin's photo collection of Black Season, and after that I started to design the details. I created a marooned place far from modern life, in which living will be pleasantly simple and soothing in a way that we don't get to experience in our daily lives."
We say: *A thoughtful combination of textures and some excellent lighting make this piece by Saeed a keeper.*

03 Dragon Bust

by Kieran McKay
3DA username Kieran McKay
Kieran McKay says: "This is a dragon bust sculpt based on the blue dragon from *Dungeons & Dragons*. It was sculpted in ZBrush and rendered in KeyShot."
We say: *When a clay render looks this good, you often wonder why a lot of artists don't dedicate a bit more time to them. This legitimately looks real – like a 3D-printed miniature that you can hold in your hand.*

04 The Journey

by Rico Cilliers
3DA username Rico Cilliers
Rico Cilliers says: "My entry for the ArtStation Journey challenge. This image was inspired by the idea that in order to truly enjoy life, we need to slow down once in a while."
We say: *There's so much to look at in this image, but it's very easy to understand as the composition is really on point. We love the distant castle and the moon peeking out from behind the creature's head.*

02

04

Rumah Kebun **by Yones Bana**

3DA username Yones bana

Yones Bana say: "This is based on my experience in Indonesia. I wanted to show how enjoyable it is to be in this cosy place in the evening. I used 3ds Max, V-Ray and Photoshop."

We say: *Strong colours and a keen eye for good composition have helped Yones to create a lovely scene here. That water looks so inviting!*

Inside The Watch **by Michael Nowak**

3DA username michaxon

Michael Nowak says: "I was always fascinated about the complexity inside watches. One day I thought how amazing it would be to show the details, and that's how the idea was born."

We say: *Much like Michael, we're fascinated by watches. Not only has he done a great job getting the finer details right, he's also nailed his materials and lighting.*

Alone Artist **by Morteza Yadegari**

3DA username Mortezayadegari

Morteza Yadegari says: "Art is created in a special atmosphere that willingly or unwillingly affects artists' minds. This space illustrates this kind of atmosphere for an artist."

We say: *This stunning image from Morteza made us quite jealous of the artist living in there. You get a lovely warm feeling from this image.*

The Journey **by Andrew Hodgson**

3DA username AndrewHodgson

Andrew Hodgson says: "For this concept, I wanted to design a ship and environment inspired by sea life around a coral reef. The full WIP thread is on my ArtStation portfolio."

We say: *This is another brilliant concept from Andrew. Loads of intricate details, a fine composition and excellent choice of colours here – good stuff.*

YOUR FREE RESOURCES

Log in to **filesilo.co.uk/3dartist** and download your 3D resources **NOW!**

EVERYTHING YOU NEED TO FOLLOW ALONG WITH THE MAGAZINE AND CREATE GREAT 3D ART

3 PREMIUM MODELS FROM CGAXIS

THIS MONTH'S COMBINED RESOURCE SIZE: 5GB

filesilo.co.uk/3dartist

YOUR BONUS RESOURCES

ON FILESILO THIS ISSUE, FREE AND EXCLUSIVE FOR 3D ARTIST READERS, YOU'LL FIND OVER 5GB OF RESOURCES, INCLUDING...

- 3 premium tree models courtesy of online model store CGAxis
- 25 amazing texture maps and skies from 3DTotal for you to use in your own work
- Exclusive, quality video tuition from our tutorial experts
- A huge selection of hi-res images and 3D scene files to help you follow along with our tutorials at home

FileSilo

FILESILO – THE HOME OF PRO RESOURCES

Discover your free online assets

- A rapidly growing library
- Updated continually with cool resources
- Lets you keep your downloads organised
- Browse and access your content from anywhere
- No more torn disc pages to ruin your magazines
- No more broken discs
- Print subscribers get all the content
- Digital magazine owners get all the content too!
- Each issue's content is free with your magazine
- Secure online access to your free resources

This is the new FileSilo site that replaces your disc. You'll find it by visiting the link on the following page

The first time you use FileSilo, you'll need to register. After that, you can use your email address and password to log in

The most popular downloads are shown in the carousel here, so check out what your fellow readers are enjoying

If you're looking for a particular type of content, like software or video tutorials, use the filters here to refine your search

Can't find the resource you're looking for in these filters? Click on More Types to specify what kind of resource you want

Green open padlocks show the issues you have accessed. Red closed padlocks show the ones you need to buy or unlock

Top Downloads are listed here, so you can get an instant look at the most popular downloaded content

Check out the Highest Rated list to see the resources that other readers have voted for as the best

Find out more about our online stores, plus useful FAQs such as our cookie and privacy policies and contact details

Discover our fantastic sister magazines and the wealth of content and information that they provide

HOW TO USE FileSilo

EVERYTHING YOU NEED TO KNOW ABOUT ACCESSING YOUR NEW DIGITAL REPOSITORY

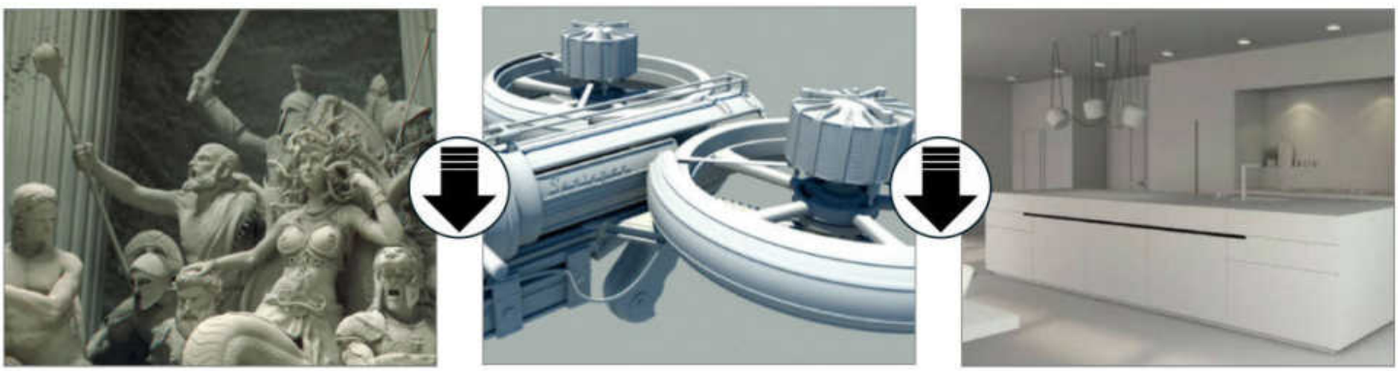
To access FileSilo, please visit **filesilo.co.uk/3dartist**

01 Follow the on-screen instructions to create an account with our secure FileSilo system, and then log in and unlock the issue by answering a simple question about the magazine. You can access the content for free with each issue of **3D Artist**.

02 If you happen to be a print subscriber, you can easily unlock all the content by entering your unique Web ID. Your Web ID is the eight-digit alphanumeric code that is printed above your address details on the mailing label of your subscription copies. It can also be found on any renewal letters you receive.

03 You can access FileSilo on any desktop, tablet or smartphone device using any popular browser (such as Safari, Firefox or Google Chrome). However, we recommend that you use a computer to download content, as you may not be able to download files to your phone or tablet.

04 If you have any problems with accessing content on FileSilo, or with the registration process, take a look at the FAQs online or email **filesilohelp@imagine-publishing.co.uk**.



NEED HELP WITH THE TUTORIALS?

Having trouble with any of the techniques in this issue's tutorials? Don't know how to make the best use of your free resources? Want to have your work critiqued by those in the know? Then why not visit the **3D Artist** Facebook page for all your questions, concerns and qualms? There is a friendly community of fellow 3D artists to help you out, as well as regular posts and updates from the magazine team. Like us today and start chatting!

facebook.com/3DArtistMagazine

Issue 96 of **3D Artist** is on sale **13 July 2016** from **GreatDigitalMags.com**

NVIDIA® QUADRO® ACCELERATE YOUR CREATIVITY.

Accelerate your creativity with NVIDIA® Quadro® — the world's most powerful workstation graphics.

Whether you're developing revolutionary products or telling spectacularly vivid visual stories, Quadro gives you the performance to do it brilliantly.

NVIDIA Quadro M6000 VCQM6000-PB	
NVIDIA Quadro M5000 VCQM5000-PB	
NVIDIA Quadro K5000 MAC VCQK5000MAC-PB	
NVIDIA Quadro M4000 VCQM4000-PB	

NVIDIA Quadro K2200 VCQK2200-PB	
NVIDIA Quadro K1200DVI VCQK1200DVI-PB	
NVIDIA Quadro K620 VCQK620-PB	
NVIDIA Quadro K420 VCQK420-PB	

Learn more **www.pny.eu/quadro & pny.quadrok-selector.com**

Insight
uk.insight.com
Tel: 0844 846 3333

Misco
www.misco.co.uk
Tel: 0800 038 8880

Dabs.com
www.dabs.com
Tel: 0870 429 3825

Scan Computers
www.scan.co.uk
Tel: 0871 472 4747

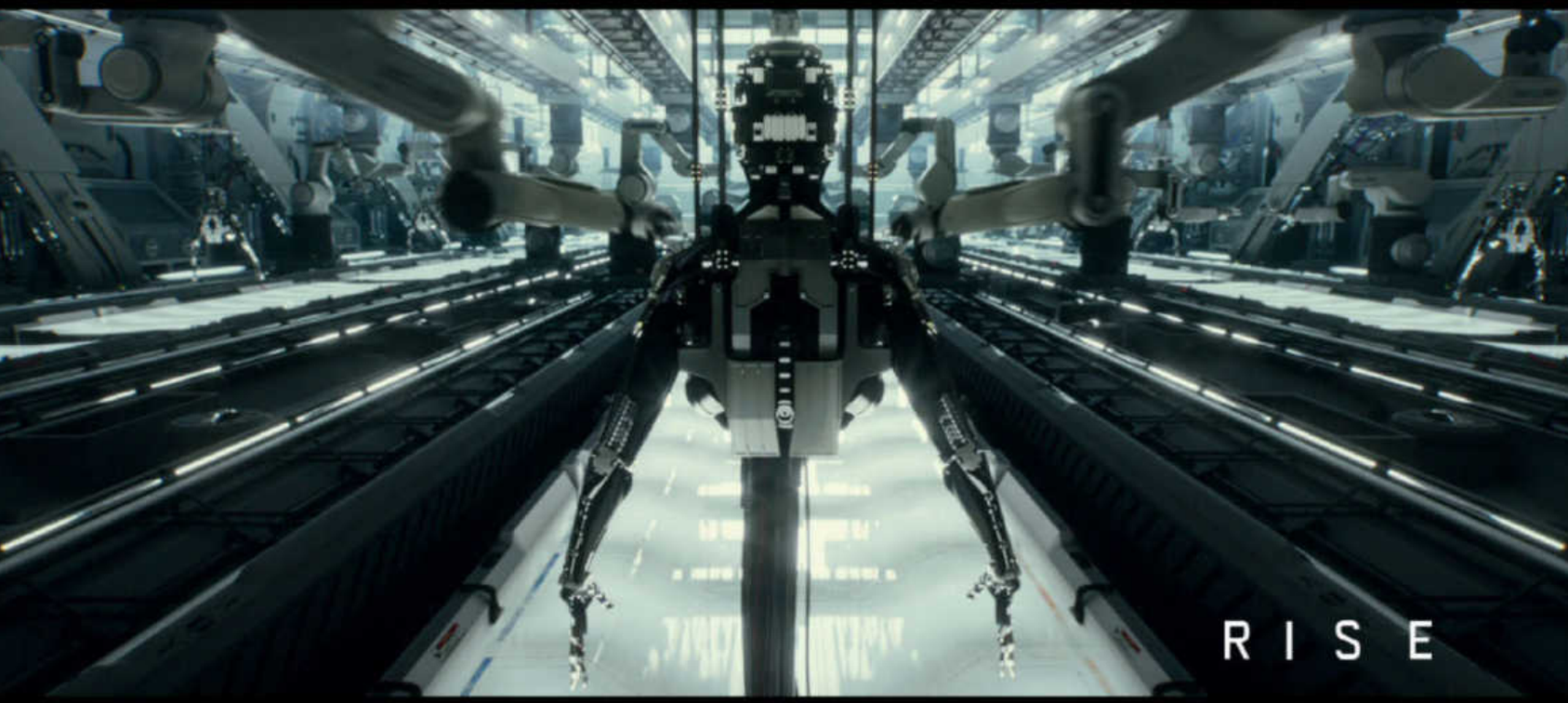
PNY® Professional Solutions

NVIDIA Quadro® / Tesla® / GRID™ / PNY SSD

NVIDIA.

© 2014 NVIDIA Corporation. All rights reserved. NVIDIA, the NVIDIA logo, and Quadro are trademarks and/or registered trademarks of NVIDIA Corporation. All company and product names are trademarks or registered trademarks of the respective owners with which they are associated.

RENDERED WITH
3000 CPUs



RebusFarm
Render Service

Making your deadline in time was never **cheaper, easier** and **faster** than now. Unleash the power of **3000 CPUs** right into your desktop.*If you are new to our online rendering service feel free to use this coupon code **3DA-RE-6RF16RX** to receive **35 Renderpoints worth 35€**. Go to our website, register and enter your coupon code. Download our advanced RebusFarm software, send some test frames and find out yourself how fast and easy it works. The RebusFarm Renderservice is processing 24/7.

35€*
FREE
TRIAL
3DA-RE-6RF16RX